THE IRON AGE

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THURSDAY, DECEMBER 15, 1904.

The Herbert Hexagon Turret Lathe.

The illustrations Figs. 1 and 2 show the latest development of the hexagon turret lathe built by Alfred Herbert, Limited, Coventry, England, and used extensively in the shops of that country for making small machine parts from bar stock.

The machine is shown driven by a direct connected electric motor having a moderate range of speed variation, which is greatly amplified by speed changes obtained mechanically by means of friction clutches in the lathe head stock. As motors having a large speed variation give a much reduced power at low speeds, the builder of this machine has selected a motor having a comparatively small speed variation. This is obtained by inserting resistance in the field circuit, which allows the motor its maximum power at the slow end of the speed range, the lighter efforts being reserved for small diameters and lighter cuts. The motor is of the direct current type, driving the head stock by means of spur gearing.

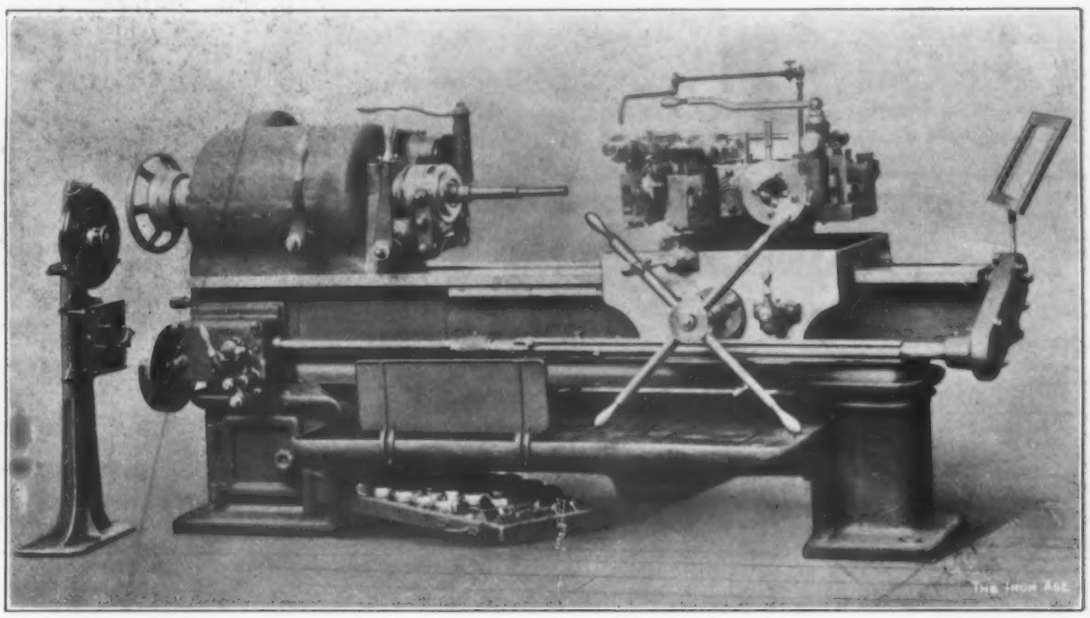


Fig. 1.—Front View of the Hexagon Turret Lathe Built by Alfred Herbert, Limited, Coventry, England.

The rear view of the machine, Fig. 2, shows the method of attaching the motor, and, as will be observed, the arrangement is compact and self contained, no separate foundation being required for the motor. The switches and controller are mounted on a stand seen at the left hand side in the front view of the machine, this being a convenient position for the operator.

The lathes are made in three sizes. The No. 2 machine admits bars up to 2 inches in diameter, has a 30-inch working stroke of turret, and will cut up to a 1½-inch Whitworth thread with a self opening die head or 2-inch with a special die head. The No. 3 machine admits bars up to 2½ inches in diameter, has a 36-inch working stroke of turret, and will cut a 2½-inch Whitworth thread with the self opening die head. The No. 5 machine admits bars up to 4⅓ inches in diameter, has a 42-inch working stroke of turret, and will cut a 3-inch Whitworth thread with self opening die head, or 4½-inch with special die head.

The machines are designed principally for producing articles such as screws, studs, spindles, &c., direct from the bar without forging. In cases where forgings must be employed, as on valve rods with forked ends, these can be handled by removing the automatic chuck and substituting a three or four jaw chuck, this change being easily made. Owing to the hollow form of the turret the work may be allowed to pass through it, so that both long and short work can be handled, and as the patent turning tool holders are very readily adjusted for diameter, it is quite economical to produce even only one or two pieces at a setting. The lathe is for this reason well adapted for jobbing and repair work.

An important feature of the machine is that it finishes each diameter from the rough bar at one cut, no finishing cut being required, and the design has been lately modified so as to take advantage of the recent improvements in high speed cutting tools.

The bar is gripped by an automatic chuck operated by the vertical lever at the front of the head stock. The chuck may be opened and closed without stopping the machine and is provided with a full set of jaws for gripping round, square or hexagon bars up to the full spindle capacity. The jaws not in use are kept in a swinging tray attached to the cabinet leg, as shown in Fig. 1, which is conveniently located and out of the way of dirt. This tray also holds the screw dies and cutting tools.

The hexagon turret is mounted on a saddle having a long bearing on the bed. This saddle is provided with an automatic feed having three changes, all obtained by moving the vertical lever seen in the front of the gear box. The feed may be reversed by throwing over the small horizontal lever seen immediately above the feed change lever. The feed is changed or reversed instantly and without stopping the machine. The automatic stops to arrest the travel of the turret are mounted on the hexagonal bar seen on the front of the machine. There are six of these, one for each face of the turret. The hexagonal bar revolves in unison with the turret, bringing into action the stop which corresponds to the tool which is working; thus any tool can be adjusted to turn any given length without interfering with the others. The feed is tripped by means of a dropping worm.

The turning tool holders are one of the most important parts of this machine. They are capable of dealing with any required reduction in diameter at one cut and

are arranged so that the same tool holder can be used for cutting either toward or away from chuck, the change being made by simply substituting a left hand cutter, using the same tool holder and back rests. On long work it is necessary, in order to produce a true running job, to commence close up to the chuck and to feed away from the head stock, thus keeping the job in tension. Fig. 3 shows the turning tool holder very clearly. After the tool has been clamped down all adjustments of tool and back rests are made entirely with the fingers and without the need of screw drivers or spanners.

For screw cutting the Coventry self opening die head is used, which is arranged to open automatically at any desired point. It is fitted with a roughing and finishing attachment, by which a finishing cut may be taken when cutting large threads on difficult material.

Although these machines are most used for ordinary bar work, such as shafts, bolts, pins, studs, bushes, &c., there are in addition a number of jobs which might appear to be unsuited for the lathe, but on which considerable economy can nevertheless be effected. Work such as piston rods, air pump rods, armature spindles, which have a long plain portion in the center, are frequently made on these machines from bright drawn steel bars, which are not machined at all on the plain central portion, but are subsequently finished on this part by grinding if a fine finish is required. One end is machined first at one operation, being supported in a bush fitting in the spindle so as to hold it true, and the second end is then finished. Work of this kind can also be centered in the lathe for the subsequent operation of grinding. Work such as boiler stays, having two threaded portions separated by an unthreaded portion, can be produced by a special arrangement of die head and guide nut so that the pitch of the two threaded portions may be continuous, so as to suit the error of the stay tap.

For repetition work having a number of diameters special box tools are furnished, enabling all the diameters to be turned at the same time. For work having long holes the machine is provided with oil tube drills, and the pump and oil fittings are arranged so as to give a forced supply through the tools. For taper work a special taper turning tool is fitted having an adjustable taper bar which can be set to any desired angle. For work having curved outlines broad forming tools are used. Examples of such work will be found in the handles of the lathe itself.

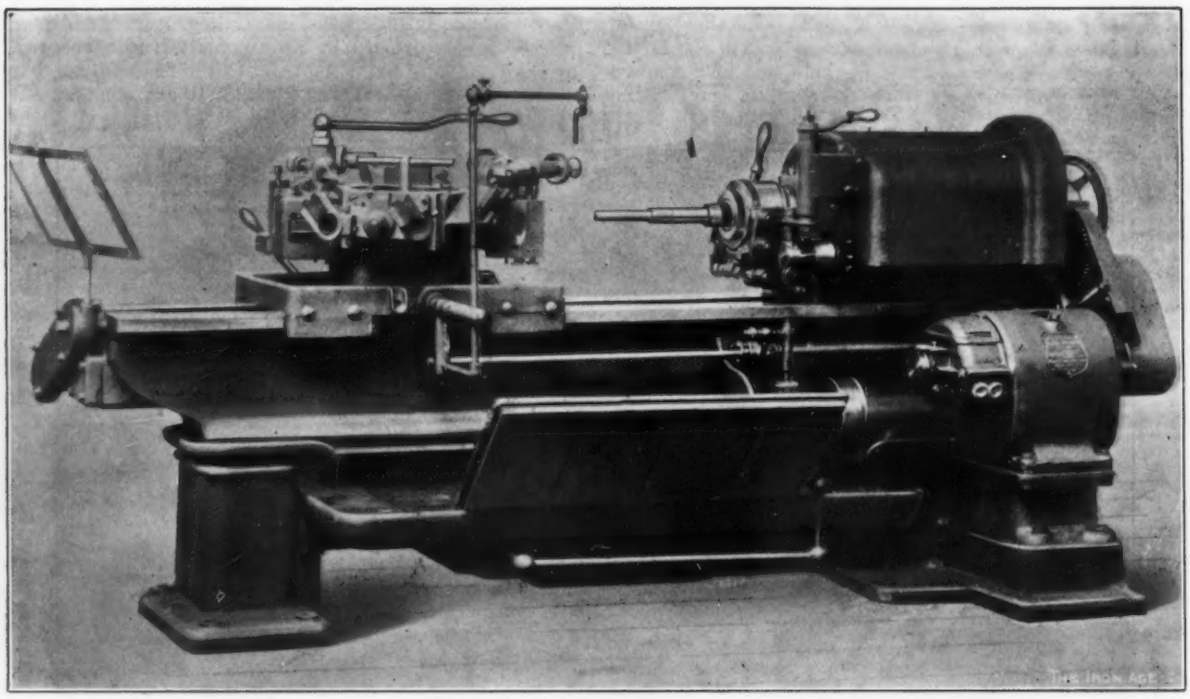


Fig. 2.—Rear View of the Herbert Hexagon Turret Lathe, Showing the Motor Drive.

Publicity for Corporations.

Greater Powers Desired for New Department.

WASHINGTON, D. C., December 13, 1904.—The first week of the new session of Congress has developed an important plan of the Administration to materially extend the powers of the Bureau of Corporations of the Department of Commerce and Labor to enable it to exercise a larger measure of supervision over corporations of all kinds carrying on an interstate business. The plan is fully disclosed in three important documents made public during the week, including the President's annual message, the annual report of the Secretary of Commerce and Labor and an elaborate bill presented in the house by Representative Littlefield of Maine, a prominent member of the Judiciary Committee. In the course of his message President Roosevelt refers at some legnth to the workings of the Bureau of Corporations, and quotes approvingly the annual report of the chief of the bureau with regard to the necessity of publicity for the affairs of corporations. In conclusion the President says: "I earnestly ask that the Congress carefully consider the report and recommendations of the Commissioner on this subject."

Work of the Bureau of Corporations.

The Secretary of Commerce and Labor incorporates in his annual report the recommendations of the Bureau of Corporations, and outlines the work thus far accomplished by the bureau in a statement that sets at rest many sensational reports recently current to the effect that the bureau had undertaken in an aggressive spirit special investigations of certain so-called trusts upon charges of the violation of the Sherman Anti-Trust act. The scope of the work of the bureau during the year and its plans for the future are succinctly set forth by the Secretary as follows:

The bureau has made exhaustive examination of judicial decisions for the purpose of ascertaining fully those constitutional powers and restrictions on which present conditions are based, and also those which must be necessarily involved in any future legislation for the improvement of present legal corporate conditions.

For the purpose of ascertaining and presenting in available form the legal conditions under which corporate business is being carried on in the various States, material obtained from 30 States has been compiled and tabulated. In each of these States, with regard to all the more important corporations or-

ganized in the State and engaged in interstate or foreign commerce, typical either of the State's industries or of its laws, every paper or document filed or recorded concerning each corporation was examined separately, and all information relating to each corporation disclosed by the official records has been collected and compiled. There have been thus far examined and abstracted the records of over 1500 corporations, which include the larger part of the more important industrial and commercial corporations, joint stock companies and corporate companies in the United States.

There is now ready for publication a compilation of the Federal and State statutes dealing with illegal industrial combinations—the so-called antitrust laws. This will afford complete information of such laws, showing in tabular and condensed form, so as to be readily available and easily comparable, their provisions, including the decisions thereunder and a digest and discussion of cases involving the common law principles as to combinations in restraint of trade.

The compilation on a uniform outline of insurance laws has been undertaken and completed in ten States. The bureau has been in communication with the insurance officials of all the States, and its agents have conferred with representatives of a large number of insurance companies, officers of boards of underwriters and insurance agents, for the purpose of obtaining the best information possible upon both the legal and the business side of insurance.

For the purpose of laying the foundation upon which direct investigations of special corporations can be intelligently conducted, the bureau has compiled, from sources other than the corporations themselves, all available information regarding certain leading combinations. From a careful analysis of this material it has been possible to form preliminary judgments regarding the economic and financial practices and effects of combinations in general, and to determine the lines of further special inquiry. On the basis of this general study preliminary outlines of inquiries to be addressed directly to the companies are being prepared.

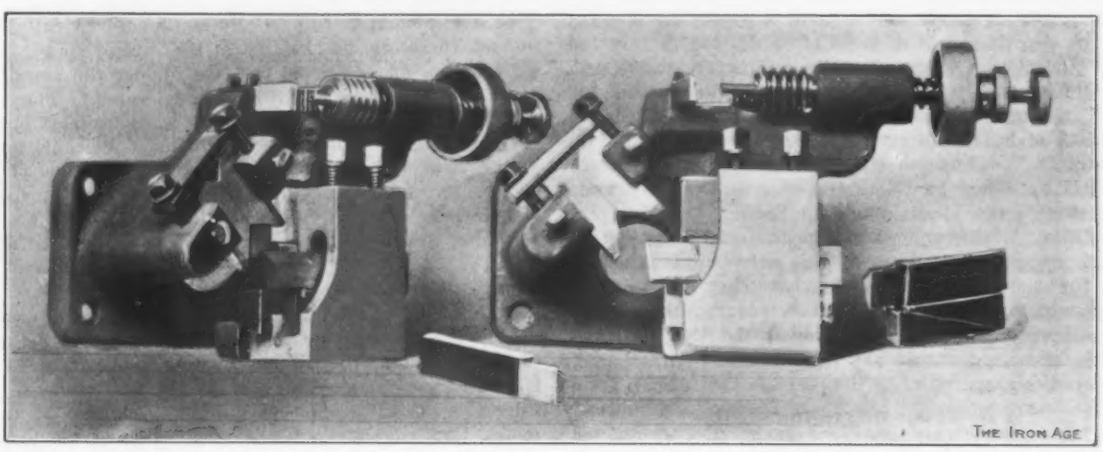


Fig. 3.—Tool Holder with Cutter for Turning Away from the Head. Cutter for Turning Away from the Head. Tool Holder with Cutter for Turning Toward the Head. Cutter for Turning Toward the Head.

A highly significant feature of the Secretary's statement quoted above is the reference to the schedules of inquiries to be addressed to corporations doing an interstate business, for in this connection the question has been raised by eminent legal authorities as to whether the bureau is in position to compel corporations to answer such interrogatories as may be presented.

Representative Littlefield's Bill.

To meet this point, however, Representative Littlefield has prepared a bill which it is understood has the approval of the President and the Secretary of Commerce and Labor, and which is in its leading features very similar to a measure which was favorably reported by the House Judiciary Committee in the Fifty-seventh Congress, but was abandoned after the passage of the bill creating the Department of Commerce and Labor. Mr. Littlefield's original bill required corporations doing an interestate business to make periodical reports to the Interstate Commerce Commission, but the creation of the new department with the Bureau of Corporations as an important division thereof raised the question as to the jurisdiction of the Interstate Commerce Commission, and it was decided to leave the matter in abeyance until the Bureau of Corporations should be completely reorganized and ready for work. Mr. Littlefield now brings his bill forward, again modified so as to require the reports referred to to be made to the Commissioner of Corporations. The principal section of his bill is as follows:

Be it enacted, &c., That every corporation which may be hereafter organized shall, at the time of engaging in interstate or foreign commerce, file the return hereinafter provided for, and every corporation, whenever organized, and engaged in interstate or foreign commerce, shall file a return with the Commissioner of Corporations for the year ending December 31 whenever and at such time as requested by said Commissioner, stating its name, date of organization, where and when organized, giving statutes under which it is organized, and all amendments thereof; if consolidated, naming constituent companies and where and when organized, with the same information as to such constituent companies, so far as applicable, as is herein required of such corporation; if reorganized, name of original corporation or corporations, with full reference to laws under which all the reorganizations have taken place, with the same information as to all prior companies in the chain of reorganization, so far as applicable, as is herein required of such corporation; amount of bonds issued and outstanding; amount of authorized capital stock, shares into which it is divided, par value, whether common or preferred, and distinction between each; amount issued and outstanding; amount paid in; how much, if any, paid in cash, and how much, if any, in property; if any part in property, describing in detail the kind, character and location, with its cash market value at the time it was received in payment, giving the elements upon which said market value is based, and especially whether in whole or in part upon the capitalization of earnings, earning capacity or economies, with the date and the cash price paid therefor at its last sale; the name and address of each officer, managing agent and director; a true and correct copy of its articles of incorporation; a full, true and correct copy of any and all rules, regulations and by-laws adopted for the management and control of its business and the direction of its officers, managing agents and directors. Nothing herein contained shall be construed as relieving any corporation from making, in addition to the foregoing, such returns as are now required by the "Act to regulate commerce," approved February 4, 1887, and all amendments thereof; but the provisions of this act, as to signing and making oath to returns and making answers on oath to written inquiries, shall be applicable to returns and such answers made under said act and amendments thereof.

So far as any return may be a duplicate of one already filed, that fact may be stated, and the details, which are in such case duplicates, need not be repeated. Upon its being made to appear to the satisfaction of the Commissioner that without fault on its part it is impracticable for such corporation to furnish any of the items aforesaid, it may, by a written order of said Commissioner, be excused from furnishing such item or items.

Said Commissioner shall cause to be prepared a blank return for the use of such corporations, containing the foregoing requirements, and shall make such rules and regulations as may, in his judgment, be necessary to carry out the purposes of this act. The president, treasurer and a majority of the directors of such corporation shall make oath in writing on said return that said return is true. The treasurer, or other officer of such corporation having the requisite knowledge, shall answer on oath all inquiries that may be made in writing on the direction of said Commissioner in relation to said return. Any corporation failing to make such return, or whose treasurer or other officer shall fail to make the answers aforesaid, may be restrained, on the suit of the United States, from engaging in interstate commerce until such return is made. Suit may be brought in any district of the United States at the election of the Attorney-General.

Penalties for False Returns.

Penalties for making false returns are provided by Section 2 of the bill and refusal to make returns is made

an offense punishable by a fine of from $500 to $5000. A section of the bill makes it the duty of the Commissioner of Corporations to cause to be published on or before June 1 in each year a list of all corporations making returns, with an abstract of such returns for free distribution to the public.

In order to overcome the great obstacle heretofore encountered in the examination of officials of corporations charged with illegal acts Section 4 of Mr. Littlefield's bill provides that in all prosecutions, hearings and proceedings under the proposed law or under the Sherman act, whether civil or criminal, "no person shall be excused from attending and testifying, or from producing books, papers, contracts, agreements and documents before the courts of the United States, or the commissioners thereof, or the Interstate Commerce Commission, or in obedience to the subpœna of the same, on the ground or for the reason that the testimony or evidence, documentary or otherwise, required of him may tend to criminate him or subject him to a penalty or forfeiture; but no person shall be prosecuted or subjected to any penalty or forfeiture for or on account of any transaction, matter or thing concerning which he may testify or produce evidence, documentary or otherwise, before said courts, commissioners or commission, or in obedience to the subpœna of either of them in any such case or proceeding."

The Circuit courts of the United States are invested with jurisdiction to try all cases arising under the proposed law, and it is made the duty of the several district attorneys of the United States in their respective districts under the direction of the Attorney-General to institute proceedings in equity to prevent and restrain all acts forbidden by this statute. A somewhat drastic provision of the bill is found in Section 6, which provides that "whenever it shall appear to the Court before which any proceedings under this act shall be pending that the ends of justice require that other parties shall be brought before the Court, the Court may cause them to be summoned, whether they reside in the district where the Court is held or not, and subpœnas to that end may be served in any district by the marshal thereof."

Fate of the Bill in the Senate.

Mr. Littlefield's bill has been referred to the Judiciary Committee, by which, as above stated, a similar measure was favorably reported in the Fifty-seventh Congress. The committee has since undergone some changes in *personnel*, but it is believed that the views of the majority with regard to legislation of this character are substantially the same as those of the committee in the last Congress. Mr. Littlefield asserts that his bill will be urged energetically, and expresses confidence that it will be favorably reported without delay. The real contest over this measure will naturally take place in the Senate if it is favorably acted upon by the House. The position of the Senate Judiciary Committee with regard to such legislation is very conservative, and in view of the fact that a new chairman is soon to be chosen in place of the late Senator Hoar, its members will proceed with unusual caution during the current short session. W. L. C.

Steam Turbines for Baltimore Electric Power.—An interesting feature of the recently announced developments in Baltimore electric power is the exclusive adoption of steam turbines as the prime mover. A contract recently closed by the Baltimore Electric Power Company with the Westinghouse Machine Company provides an initial equipment of 4000 kw. in two generating units of 2000 kw. each. A Westinghouse electrical equipment, complete and modern in every particular, has also been contracted for. Officers of the company state that the power plant will embody the latest developments in steam and electrical engineering. Being located outside of the congested districts of the city, all the boilers and heavy machinery will be on the ground floor. Floors and roofs will be of steel-concrete construction. The steam turbine plant will operate with a boiler pressure of 175 pounds and a superheat of about 100 degrees F. A high vacuum condensing system will be installed, capable of sustaining a vacuum of 28 pounds at full load on the plant. The plant in its entirety has been designed on the separate unit plan, which virtually consists of a number of distinct power plants placed side by side, each entirely separate from the other, but each capable of helping out the other in case any link in the system should be disabled. This holds good through the entire apparatus, from the coal pile to the customer's building. In addition to this precaution against interruption of service, which is thus insured, the company will install a large storage battery which will ordinarily "float" on the system. The construction work is already under way and will be pushed as rapidly as possible in order that the plant may be complete in all respects and running smoothly by July next.

The Steel Bloom Case Won by Importers.

A decision against the United States, involving the refund of duties in excess of $1,000,000, paid for the importation of steel in the form of blooms from about 1879 to 1882, has been handed down by the Court of Claims at Washington, D. C. The decision was in the case of the Cambria Iron Company against the United States, which was brought to test the validity of the ruling of the Secretary of the Treasury that under the law of 1867 steel blooms were partially manufactured rails, and should, therefore, be assessed at the rate of 45 per cent. ad valorem, instead of 30 per cent., under the classification of "other forms of steel not enumerated." The case, which has become celebrated in the steel trade, is one of a large number of the same class filed in the court under the provisions of an act passed at the last session of the Fifty-seventh Congress conferring on the court jurisdiction to hear and determine certain specified claims for refund of duties paid in excess of what was alleged to be the legal rate. It is possible that the Department of Justice may take an appeal to the Supreme Court, although it has not yet been determined to take that course.

The list of claimants, which was published at the time of the passage of the act of Congress above referred to, is as follows: J. F. Bailey & Co., H. E. Collins & Co., Edgar Thomson Steel Works, Limited, Carnegie Brothers & Co., Limited, James Lee & Co., Downing, Sheldon & Co., R. F. Downing & Co., Albany & Rensselaer Iron & Steel Company, Joliet Steel Company, Cleveland Rolling Mill Company, O. L. Garrison, for Vulcan Steel Company and St. Louis Ore & Steel Company; St. Albans Iron & Steel Company; Godeffrey & Co., for the Albany & Rensselaer Iron & Steel Company; Oliver L. Garrison, A. E. Godeffrey & Co., James Johnston, Clarke, Post & Martin and Post, Martin & Co., agents for Springfield Iron Company; Charles W. Matthews, Harry C. Arbuckle and Brown Brothers & Co., agents for Charles W. Matthews; E. Samuel & Co., Henry W. Oliver, Jr., A. H. Childs, agent for Henry W. Oliver, Jr.; Lewis, Oliver & Phillips, Schrader & Ellery, Peter Wright & Sons, agents for Cambria Iron Company; Diamond State Iron Company, Interstate Improvement & Construction Company, Baltimore & Ohio Railroad Company, agents for Interstate Improvement & Construction Company; Charles H. and Eugene Odell, agents for Sandusky Rolling Mill & Mfg. Company and Northern Pacific Railroad Company; Northern Pacific Railroad Company, Drexel, Morgan & Co., A. H. Barney and Robert Garrett & Son, agents for Northern Pacific Railroad Company; E. S. Wheeler & Co. and Edgemoor Iron Company.

It is proposed to establish a system of freight tunnels in the city of Boston, and the matter may be presented to the Legislature this winter. Especially needed is such a connection between the North and South passenger stations, and between the freight terminals of the Boston & Albany and New York, New Haven & Hartford railroads on the south and those of the Boston & Maine and the piers of the northern section of the city. Such a tunnel may be built, it is stated, at a lower level than the East Boston tunnel, but the general question is complicated by the existence of the Subway and its possible extensions.

Seamless Steel Bathtubs from One Sheet.

A new company, which proposes to establish an industry of great importance to the plumbing and steel working trades, has just been launched at Detroit, Mich. It is known as the Seamless Steel Bathtub Company, and is capitalized at $600,000. A glance at the following list of directors and stockholders is sufficient guarantee that the enterprise is a solid one:

Directors: A. B. DuPont, Joseph Boyer, Theodore D. Buhl, Geo. H. Barbour, Jr.; A. E. F. White, William P. Stevens, Antonio C. Pessano, Geo. B. Russel, Eugene H. Sloman. Other stockholders: Geo. H. Russel, W. C. McMillan, J. C. Hutchins, Henry Russel, H. B. Ledyard, R. A. Alger, F. H. Walker, Peter White, Bryant Walker, Walter S. Russel, Geo. B. Russel, T. H. Bowles, Henry M. Campbell, Ryerson Ritchie, Fremont Woodruff, A. E. F. White, B. F. Berry, E. L. Ford, N. D. Carpenter, DeWitt Loomis, Albert M. Henry.

The officers of the company have not yet been selected. Mr. Pessano is president of the Great Lakes Engineering Works. Mr. Buhl is president of the Buhl Stamping Company and actively interested in many other large enterprises. Gen. Russell A. Alger is too well-known to need further mention. Geo. H. Barbour, Jr., is the son of the vice-president and general manager of the Michigan Stove Company. The Russels are among the most prominent and wealthy business men of the State, and, taken altogether, one would have to go far to find a stronger body of men united in one enterprise.

Members of the company state that, for the first time in the history of the world, a process has been invented whereby a complete bathtub can be stamped from a single sheet of steel, without a flaw or a wrinkle, and this without heating the metal. The saving in cost of manufacture and in freight rates, on account of the ability to nest two or three light steel tubs for shipment, and the fact of this steel tub being porcelained on both sides, present many advantages. The Buhl Stamping Company had been for some time making bathtubs from sheet steel, but its process used three pieces and the seams interfered with porcelaining.

Through George B. Russel, by contract with Eugene H. Sloman, the Seamless Steel Bathtub Company was formed, and has acquired the American patents, for the manufacture of bathtubs and kindred plumbing supplies, of a rocker roller press, invented by Charles F. Murdock some years ago. The patents had been assigned to Eugene H. Sloman, who for the past four years has been developing Murdock's process, and who at last succeeded in making a tub out of one sheet of seamless steel. This tub is 5 feet long and weighs 110 or 115 pounds, and is porcelained on both sides.

The company will immediately erect a plant in or near Detroit that will have a capacity at the start of 150 tubs a day. The main building will be 200 x 400 feet.

Mr. Sloman, in speaking of the plans and processes of the company, says: "The lightness of the steel tubs turned out by this rocker roller process will enable us to capture a good share of foreign trade. We also turn these tubs out of single sheets of copper with just as much ease. We have used steel from six different companies, and in no case have we had a failure; and, what is more, the most intense heat does not injure the finished tubs."

Mr. Pessano states that the application of the principles by which the tubs are made will be extended to other lines of manufacture, making possible the fabrication of many articles from sheet steel that have thus far baffled commercial exploitation.

President James W. Porch of the Panama Commercial League and Secretary Fred. Muller of the New Orleans Board of Trade, who were sent on a mission to Colon, Panama, were expected to arrive in New Orleans December 14. New Orleans advices state that success has attended the expedition and that every part of the plans has been carried out without hitch. It is understood that Mr. Porch, in his triple capacity as vice-president of the Board of Trade and chairman of the standing committee for the advancement of the propaganda of the Mississippi & Orient Steamship Company and president of the Panama Commercial League, will take up on his return the active work of persuading the commercial and business organizations of the Mississippi Valley that the proposed steamship line is feasible and practicable. The Board of Trade, the Panama Commercial League, the Southern subcommittee of the Congressional Commission on the American Merchant Marine and Congressman Hepburn of the House Committee on Interstate and Foreign Commerce have all expressed approval of the enterprise, and the former two organizations have formally indorsed it.

The Philadelphia Foundrymen's Association.

The one hundred and forty-second meeting of the Philadelphia Foundrymen's Association was held at the Manufacturers' Club in that city Wednesday evening, December 7. President Thomas Devlin occupied the chair, and called the meeting to order at the usual hour. There was no special business before the association. This meeting being the fourteenth annual, the treasurer presented his report for the year, showing a balance of $1698.79 on hand, with all bills paid. The election of officers followed and resulted in the unanimous re-election of all the incumbents, as follows:

President, Thomas Devlin, Thomas Devlin Mfg. Company, Philadelphia; vice-president, Alex. E. Outerbridge, Jr., Wm. Sellers & Co., Incorporated, Philadelphia; treasurer, Josiah Thompson, J. Thompson & Co., Philadelphia; secretary, Howard Evans, J. W. Paxson & Co., Philadelphia. Executive Committee—H. O. Evans, Thomas Devlin Mfg. Company, Philadelphia; Thomas M. Eynon, Eynon-Evans Mfg. Company, Philadelphia; E. E. Brown, E. E. Brown & Co., Philadelphia; R. C. Oliphant, Trenton Malleable Iron Company, Trenton, N. J.; Thomas B. Harkins, Harkins Foundry Company, Bristol, Pa. Trustees—Thomas Devlin, president; Josiah Thompson, treasurer; Howard Evans, secretary.

During the evening Roy U. Conger of the Sheldon School of Scientific Salesmanship of New York addressed the meeting on the subject of "Salesmanship as an Applied Science." After adjournment luncheon was served in the dining room of the club. Howard Evans acted as toastmaster, and short addresses were made by Thomas Devlin, Roy U. Conger, Harvey J. Fuller, Arthur Simondson and a number of others.

The Merchant Bessemer Furnaces.—An official report issued December 7 by J. G. Butler, Jr., chairman of the Bessemer Pig Iron Association, states that 191 blast furnaces tributary to the Lake Superior ore region reported to the association on December 1. Of this number 144 were in blast, representing a daily capacity of 44,086 gross tons, and 47 were out of blast, representing a daily capacity of 12,709 tons. The increase in the active capacity since November 1 is 3 per cent. The active capacity from the beginning of the year is as follows:

Date.	Per cent. of total.
January 1	35½
February 1	62
March 1	72
April 1	85½
May 1	89½
June 1	80
July 1	65
August 1	59
September 1	72
October 1	74
November 1	75
December 1	78

On November 20 there was unveiled at the School of Mines at Leoben, Austria, the monument to Peter Ritter von Tunner, the famous metallurgist. It is the creation of Karl Hackstock of Vienna. Tunner became professor of the metallurgy of iron in May, 1835, at Leoben, at the age of 26 years. He remained in that position until July, 1866, and in 1874 resigned as director of the School of Mines.

The Sargent Gas Engine.

The Sargent complete expansion gas engine is distinguished from the more common form of gas engine in that it is double acting and expands the burning charge practically to atmospheric pressure, the point of cut off being varied with the load as in a steam engine and the time of ignition advanced as the mixture gets weaker and the inflammation slower. The advantages claimed are increased efficiency, increased regularity in speed and smooth running under early cut offs.

As shown in Fig. 1, the general design is symmetrical and such that all strains come in a straight line, with provision, however, for the free expansion of the cylinders and rods. The sub-base of the engine is set flush with the floor and extends from end to end, giving a flat planed surface upon which the engine is easily erected and aligned. The sub-base and main frame are bolted to the foundation, and the cross head guides, cylinders and distance head are fastened to the main frame, so as to be free to expand, sliding on the hollow supports rising from the sub-base. These serve the double purpose of maintaining the cylinders in line and conveying the gas and air from the hollow divided sub-base to the explosion chambers, eliminating the usual piping.

A feature that will be noticed is that the crank, connecting rod, cross head and guides are all inclosed to exclude dirt and retain the oil. At the same time these parts are accessible even while the engine is running. A steady stream of oil flows upon every bearing primarily to insure perfect lubrication, but also to assist in carrying away the heat, in order that overload may not injure the bearings or rubbing parts.

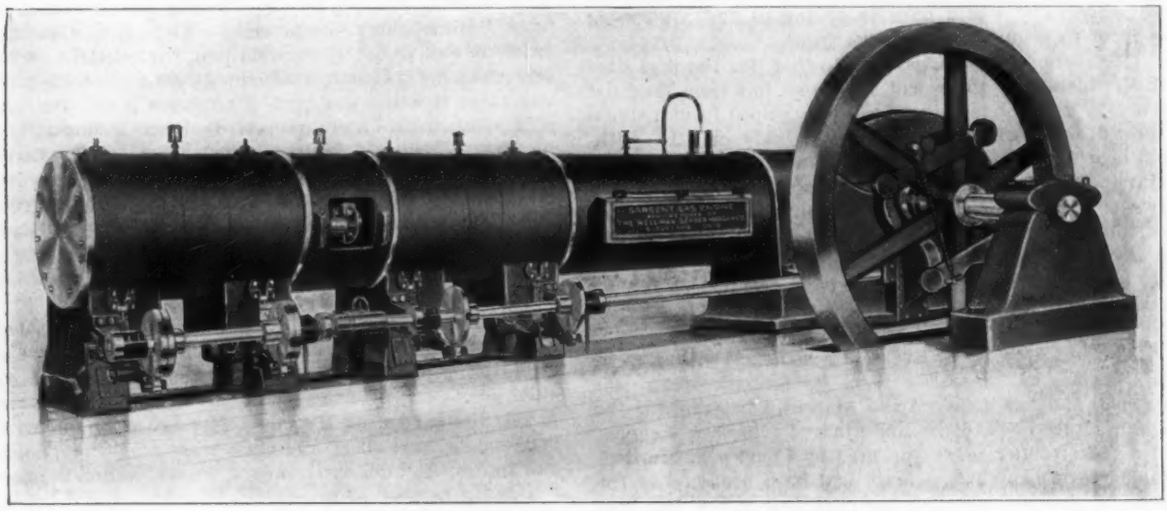


Fig. 1.—The Sargent Complete Expansion Gas Engine.

In the usual gas engine the piston at full load draws in a cylinder full of combustible mixture which, after compression and ignition, is expanded to the original volume and released at a pressure of 40 to 50 pounds absolute, and a temperature of from 1500 to 1800 degrees F. In the Sargent gas engine the admission of gas and air at full load is cut off at from five-eighths to three-quarters of the admission stroke, depending upon the fuel used, which, after compression and ignition, is expanded to the cylinder volume and is released at a little above atmospheric pressure with a corresponding temperature of about 400 degrees F. The point of cut off, while constant for the full and most economical load of the engine, is advanced by the governor at lighter load or deferred at heavier load, giving great flexibility. The incoming charge is not throttled.

All of the moving mechanism which has to do with the operation of the engine is mounted on one side and consists of a side shaft driven by the crank shaft and governor through a pair of worm gears running in oil. This carries two cams for each explosion chamber, one for the igniter and one to operate the valves. Fig. 2 shows a section through the valves of one of the explosion chambers. By removing six nuts the valve bushing and valves can be removed from the cylinder for regrinding or inspection.

The sequence of operation is as follows: Gas is piped to the chamber A, Fig. 2, in the sub-base and air to the chamber B, both then passing through the cylinder supports to the chambers A′ and B′, where they are ready to enter the mixing chamber when the cam depression from M to N passes the roller and the ports F in the piston valve register with the ports E and D in the bushing. When the piston valve goes down to this position the confined air in the inlet and piston valve dash pot forces open the poppet valve, giving free admission to the charge. When the point N of the cam reaches the roller the latter is forced down while the other end of the lever moving up carries the piston valve and cuts off the admission. The poppet valve seats and both valves remain in normal position during compression, ignition and expansion or until the point L of the cam pushes the roller down and the piston up. This action opens the poppet and the exhaust gases pass out through ports K and the elbow W to the exhaust pipe under the floor. The poppet valve seals the opening in the combustion chamber during compression and inflammation, and the piston valve, holding against any pressure, works loosely in its bushing, cutting off the admission and guiding the exhaust. As the poppet valve controls both the inlet and outlet gases, the valve and its seat are kept comparatively cool, greatly reducing the frequency of necessary regrinding. By revolving the piston valve by the index wheel, the blind port S varies the mixture to suit the quality of gas used.

A Rites inertia governor in the fly wheel controls the speed of the engine, advancing the valve shaft in respect to the crank shaft as the speed increases, thus diminishing the mean effective pressure with the load. As the load becomes lighter the cut off occurs earlier, taking less of a constant mixture of gas and air into the cylinder, but as the burned products in the clearance are not reduced, the mixture becomes weaker and more slow in burning. If the ignition were at the same point as at full load the highest pressure would not be attained until the piston approached the middle of the stroke, where the cooling surface is so increased that the greater part of the heat would go into the water jacket, instead of into work.

While the governor controls the speed through all ranges of load, the gas engine, like the steam engine, is not economical with very light loads. Where the variation in the turning moment is not objectionable, one or more of the explosion chambers may be cut out at will by the engineer by raising to a horizontal position a controlling lever which holds the exhaust open and the gas and air closed. This feature is desirable in blowing en-

gines, as they can be designed so that two explosion chambers will furnish air at 15 pounds and the four chambers at 30 pounds pressure.

The cylinders are oiled by a force feed pump or check valve lubricators. The valves receive sufficient oil from the cylinders. The side shaft and outboard bearings are self oiling. The cross head guides, pin, crank pin and main bearings, which must be thoroughly lubricated at all times, are copiously oiled by the worm gears, which act as a pump.

Two electric igniters are placed in each explosion chamber in a position such that they are surrounded with a pure mixture at the time of ignition. Either will fire the charge, but should one become short circuited, the engineer is immediately warned.

Compressed air is used for starting the engine. The pressure of the air when turned into one cylinder puts the starting mechanism in operation and simultaneously puts the cylinder out of service as a gas engine. When the engine is up to speed, turning off the air puts the gas

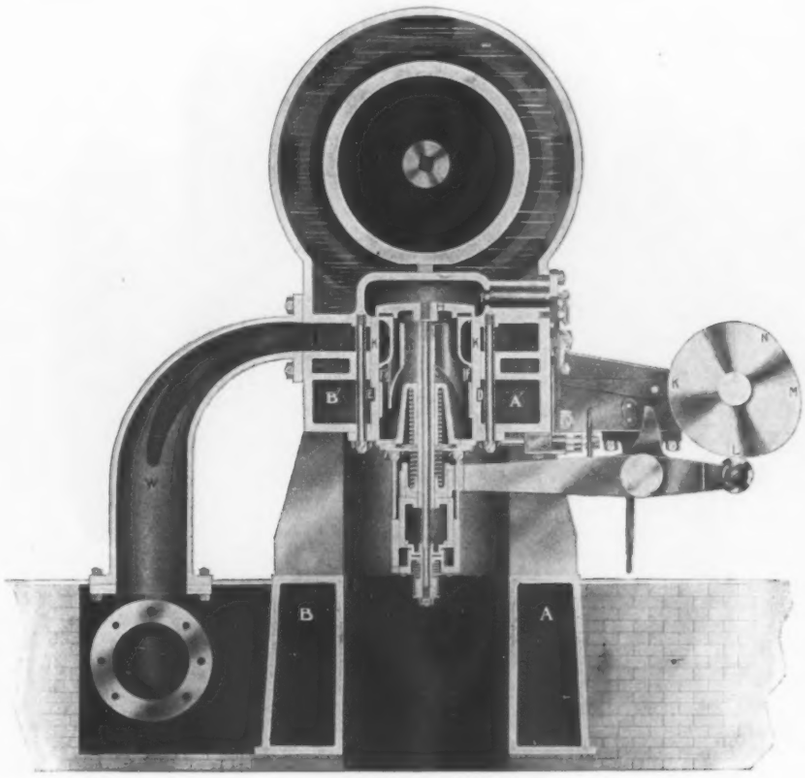


Fig. 2.—A Transverse Section through the Valve of the Sargent Gas Engine.

engine into commission without occasioning the changing of a valve, cam or lever.

The cylinder walls, head, rods and piston are water jacketed to prevent overheating. Every valve lever, timing screw and part requiring adjustment is readily accessible. All of the mechanism is above the floor line, yet below the center line of the engine. To gain access to each explosion chamber it is simply necessary to remove the cylinder head without further dismantling the engine. The time of ignition and the ratio of gas and air may be changed while the engine is in operation.

The Wellman-Seaver-Morgan Company, Cleveland, Ohio, has the exclusive right to manufacture and sell the Sargent complete expansion gas engine, and is prepared to furnish the engine in units of 100 horse-power up, in single cylinder, tandem and twin tandem styles.

The National Rolling Mill Company, Vincennes, Ind., is to have the new 8-inch mill in operation about January 1. When this mill is completed the company will be prepared to roll material in rounds and squares from 3-16 up to 2 inches and in flats from ⅜ x ⅛ to 4 x 1¼ inches, the heavier sizes being made on the present 10-inch mill. This mill will be new throughout and will have a Belgian train, the Belgian mill being run by a separate engine and the main train by its own engine. This idea has been worked out by S. N. Bradshaw, general manager, and it is believed that it will result very advantageously from the fact that if anything is wrong on the Belgian mill it can be stopped without the necessity of stopping the main train, or *vice versa*.

Berger's Charcoal Iron Sheets.

An extremely attractive pamphlet is being distributed by the Berger Mfg. Company, Canton, Ohio, under the title of "Ye Olden Time Charcoal Iron," which contains an interesting description of the method of manufacturing the charcoal iron sheets made by the concern. A view of the great plant of the Berger Mfg. Company is presented on the opening page, opposite which is a *facsimile* of the guarantee given with Berger's guaranteed rehammered charcoal iron, bearing the company's seal and the signature of the general manager. The certificate is to the effect that this brand "represents an iron base, melted and refined in knobbling fires, according to the old style process of production, charcoal being used as fuel, and this material is hammered and rehammered, rolled and rerolled into a bar for the finishing mills, it being made from genuine knobbled pure charcoal iron blooms." Following is a complete description of the process of manufacturing charcoal iron sheets from the initial stages of preparing the charcoal and reducing the iron from the ore to the time at which the sheets are ready for use to be made into either galvanized iron or tin plate. Each process, as presented, is accompanied by an illustration of that particular stage of manufacture. The company states that each sheet of its galvanized iron, tin plate, corrugated roofing or siding which is made of this charcoal iron will be stamped with the registered trade-mark, "Berger's Guaranteed Rehammered Charcoal Iron," and each joint of eave trough or conductor pipe made of the same material will bear a brass label carrying the same trade-mark. This the manufacturers believe will protect the consumer against purchasing any spurious makes of so-called charcoal iron.

An Indicating Steam Meter.*

There has been for many years a demand for some practical device which will measure or indicate the amount of steam in pounds which is delivered through pipes to an engine, radiator or steam pump. Several devices have been designed for the purpose, but on account of the changing conditions of steam only partial success has been attained. With a permanent gas of practically uniform pressure and temperature, such as illuminating gas, the metering would be a simple problem, but steam is not a perfect gas and usually varies in pressure and temperature many pounds and degrees, and contains more or less water, depending on the distance from the boiler and the efficiency of the insulation of the radiating surfaces. As the steam pressure in various plants varies from below atmospheric pressure when used for heating to as high as 200 pounds per square inch where used for power in multiple cylinder engines and steam turbines, meters with considerable range are required, no matter where or for what purpose they are to be used. To design a meter to operate successfully under these varying conditions has been the aim of the writer, and the device herein described is believed to overcome many of the difficulties which have heretofore been obstacles to success.

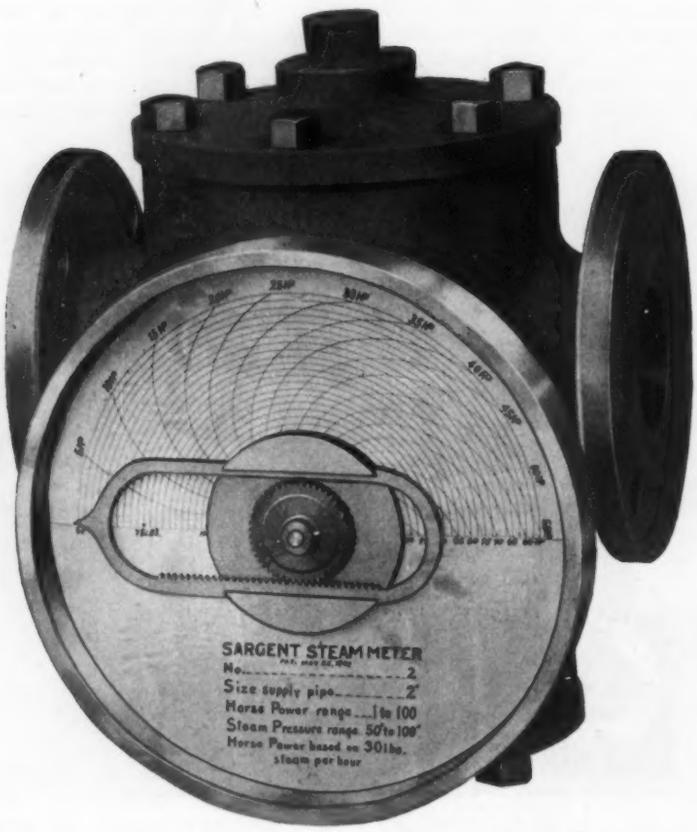


Fig. 1.—A 2-Inch Sargent Indicating Steam Meter.

If there is a constant difference between the pressures each side of a certain opening the amount of steam flowing through that opening will depend on the area and the density of the steam, which varies with the pressure. If the initial pressure and the difference in pressure remain constant, then the weight of steam flowing through will depend on the area of the opening, and if the opening is constant the weight of steam flowing through will vary with the pressure and the difference of pressure on either side of the opening.

If the difference in pressure between two tanks is 1 pound, and the initial pressure varies from 50 to 100 pounds, twice as much steam will flow through a certain opening with 100 pounds pressure as would flow through with 50 pounds pressure. In the meter under consideration, which is designed for steam pressures of 50 to 100 pounds, a drop of 2 per cent. is thought advisable, and the areas are proportioned accordingly. When steam is flowing through, the opening will adjust itself, so that the difference of pressure is always a percentage of the pressure on the inlet side. Any tendency of the pressure to equalize will immediately close the valve, and by thus throttling the passage reduce the outlet pressure below the inlet pressure, as designed. Any tendency for the outlet pressure to reduce more than 2 per cent. below the inlet pressure will raise the valve and increase the area of the steam passage. Slugs of water coming with the steam cannot by inertia open the valve D, Fig. 2, because they cannot strike the valve except radially, and it is balanced against such a force. As the opening F is small and changes the direction of any water which might tend to go through should the valve suddenly open, no harm can arise from water in steam, except, possibly, to introduce an error in indication.

The main valve stem E will stand between the position of the full opening or the complete closure of the valve, depending on the amount of steam passing through, and the position of this valve stem determines the movement of the indicating finger around the center of the dial, through mechanism hereafter described and shown in Figs. 1, 3 and 4.

If the steam always had the same density no further indicating apparatus would be necessary, but as the weight per volume varies with the pressure, the same quantity of steam under double the pressure will flow through one-half the area for the same length of time; also, if the difference in pressure increases with the absolute pressure more steam will flow through a certain opening when the pressure increases than if the difference in pressure each side of the opening remained constant. On the assumption, then, that pressure times volume equals a constant ($P\ V = C$) which is near enough for practical purposes, we can determine the amount of steam passing from one receptacle to another,

* Abstract of a paper by C. E. Sargent presented at the New York meeting (December, 1904) of the American Society of Mechanical Engineers.

if we know the difference in pressure in the two receptacles, by determining the area of the opening through which the steam flows; but as the weight of steam passing through a defined opening will vary with the pressure, and the difference in pressure each side of the opening, then we must vary our opening with the pressure if a uniform weight is flowing through. And this is the principle upon which this meter is based. With a constant weight or horse-power passing through the pointer will follow the horse-power curve on the dial, though the pressure of the steam varies between the limits of the meter.

In any steam pipe in which the steam is not superheated there is more or less condensation. While any steam meter should have a separator between it and the boiler, water can in no way affect the mechanism of this meter, as all moving parts are protected from derangement caused by the inertia of water passing through the openings.

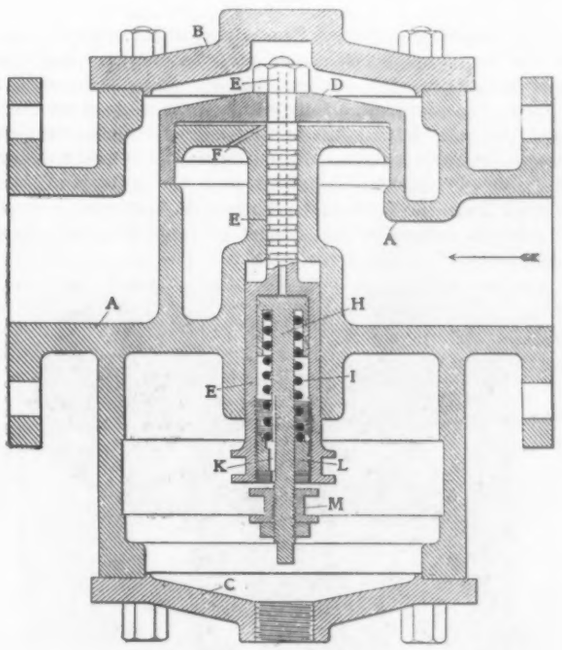


Fig. 2.—Longitudinal Section of the Sargent Steam Meter.

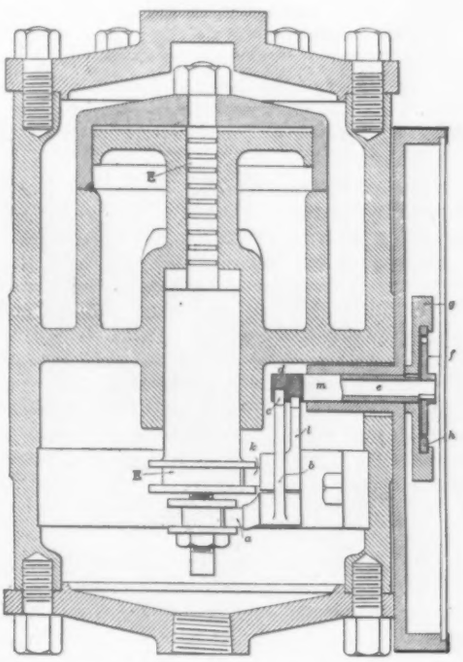


Fig. 3.—Transverse Section of the Sargent Steam Meter.

Fig. 1 is a half-tone of a 2-inch meter, showing the dial side and compensating pointer. It is flanged and faced and can be inserted in the steam pipe as an ordinary 2-inch globe valve. This particular meter is calibrated to show the horse-power (based on 30 pounds of steam per horse-power hour) passing through with a steam pressure of between 50 and 100 pounds. Fig. 2 is a longitudinal section, Fig. 3 a transverse section and Fig. 4 an elevation of the indicating mechanism looking toward the back of dial. Referring to Fig. 1, if no steam is flowing through the meter the pointer will indicate zero horse-power, as in the figure, but will indicate the pressure if it ranges between 50 and 100 pounds. As the end of the pointer will not begin to move toward the center of the dial until the pressure reaches 50 pounds, it will stand at 50 pounds when there is no pressure in the meter. If the pressure were maintained exactly at 50 pounds, and 150 pounds of steam passed through per hour (5 horse-power at 30 pounds of steam per horse-power hour), then the pointer would stand at 5 horse-power and 50 pounds pressure. If 40 horse-power were passing through the pointer would so indicate, and if the pressure were raised from 50 to 100 pounds the end of the pointer would follow the curve of 40 horse-power from the 50 to the 100 pressure limit. In like manner the pointer would indicate the weight of steam passing through, no matter how the quantity or pressure varies, provided it remains within the limits of the machine.

In Fig. 2, which shows the steam passage and moving parts, A is the body of meter, B the top cover and C the bottom cover; D is the self adjusting valve, which remains seated when no steam is passing through the meter, and which is held in place by and fastened to the valve stem E, which works in two diameters in the body A. The bottom cover C is tapped for ¾-inch pipe, which connects the meter to the atmosphere or sewer. The action of the meter is as follows: Steam is admitted on the side of the arrow and surrounds the valve stem guide; as soon as pressure accumulates it passes through the small hole F and raises the self adjusting valve D, allowing the steam to pass to the outside and top of the valve. As the bottom end of the stem E is open to the atmosphere the pressure on top of the valve

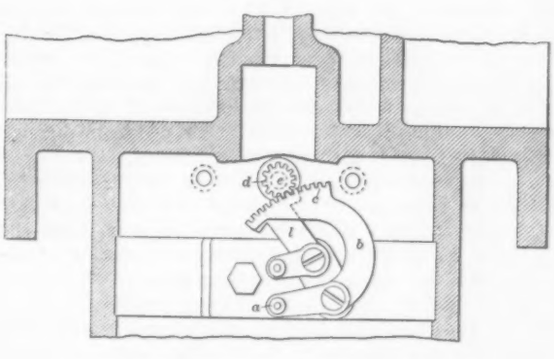


Fig. 4.—Detail of the Indicating Mechanism.

D tends to close same by an amount of pressure equal to the pressure in the meter into the area of the valve stem immediately below the valve. As the pressure under the valve is always tending to open it, and the pressure on the stem is always tending to close it, there will be a difference in pressure between the inlet and outlet of the meter equal to the difference in area of the valve and valve stem. As these areas are so designed that the ratio is about 50 to 1, the pressure of steam on the discharge side of the meter will be 2 per cent. less than on the admission side with any pressure carried. If 100 pounds pressure is carried on the boiler side of meter 98 pounds pressure will be delivered on the engine side, and if the admission pressure is only 50 pounds the discharge pressure will be 49 pounds.

Referring to Fig. 2, the pressure of steam above the valve D, and on the outlet side of the meter, may pass through the hollow valve stem E and act on the piston H, compressing it, and the spring I, which in the

present case is of such a tension that 50 pounds pressure per square inch is necessary to overcome its statical conditions, and 100 pounds per square inch is sufficient to compress it to its full limit. The movement of this piston H is transmitted to the roller *a*, Figs. 3 and 4, which, through the bell crank *b*, the segment *c*, the pinion *d*, the shaft *e* and the large pinion *f*, Figs. 1 and 3, and the rack *h*, transmits the movement of the end of the pointer to and from the center of the dial, showing the steam pressure per square inch on the meter.

The position of the main valve stem E is transmitted through the roller *k*, the bell crank *l*, the hollow shaft and pinion *m* and the disk *g*, which revolves the pointer around the dial center. The amount of movement around the center depends upon the opening of the valve, and the distance of the end of the pointer from the center of dial depends on the steam pressure per square inch between the limits of the meter of 50 and 100 pounds, and, on account of the compensating mechanism, the pounds avoirdupois of steam or horse-power passing through is always indicated.

The size of the pipe and meter determines the maximum possible horse-power on the dial, while the number of the spring determines the range of pressure required.

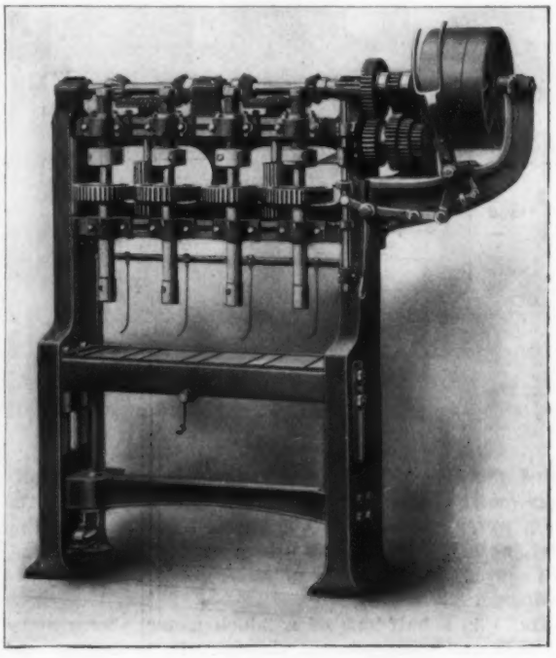
In measuring exhaust steam for heating, the spring and dial are designed to show a pressure from 0 to 30 pounds absolute, and the dial may indicate pounds of steam instead of horse-power. If the steam pressure upon which the horse-power of the engine is based is 150 pounds, then the meter spring and dial would show a range of horse-power from 0 to full meter capacity and a pressure range from 125 to 175 pounds, or greater range if desired. By carrying extra springs and dials to correspond meters for any range may be furnished from stock on short notice, fully graduated for the pressure desired.

It was the intention to calibrate each meter sent out, but when two or more of the same size are calibrated in series the indications correspond so closely that it is expected that the calibration of only one of a size and range will be found sufficient. The method of calibrating a meter is as follows: From the meter's construction there must always be a difference in the steam pressure each side of the meter, depending on the inlet pressure; therefore the amount of steam flowing through will regulate the amount of valve opening. As the difference in pressure between the two sides of the meter increases as the pressure increases, the opening through which the steam flows will not increase as fast as the pressure in order to let the same weight of steam through in a certain time, and this is advantageous, because the valve will require less movement as the pressure increases. In order to calibrate the meter it is necessary first to get a spring of the proper tension to move the end of the pointer from the outside to the inside of the dial through the range of pressure required. The spring is first calculated, then can be adjusted when hot and in place, if necessary, by holding the outside valve stem E and turning the inside valve stem with a socket wrench. The meter is connected up between the steam header and condenser with a pressure regulating valve in series between the meter and steam supply. Accurate gauges are connected to both the inlet and outlet sides of the meter, and the pressure regulator is set to carry the highest pressure for which the meter is calibrated. A valve on the discharge side is opened slightly and the position of the pointer noted, and the quantity of steam flowing through is condensed and weighed. In like manner a series of points for a constant pressure is established through the whole capacity of the meter. The pressure is reduced and the operation is repeated. When completed and the points are connected there will be a series of concentric rings representing the different pressures and a series of converging or diverging curves representing the pounds of water passing through, which is indicated by the position of the pointer when the meter is in operation.

The spring should be of steel, heavily nickel plated. The meter may be inserted in the steam pipe, either next to the boiler, in which case no separator need be used, or next to the engine, in which case a separator between the meter and boiler, as close to meter as possible, should be used, and a drum having four times the capacity of the first cylinder at its average cut off should be placed between meter and engine to get a constant flow through the meter and a practically stationary position (nonoscillating) of the pointer. By observing the position of the pointer for any interval of time the amount of horse-power or pounds of steam passing through to the engine or heating system may be determined.

The National Multiple Spindle Reversing Tapper.

To understand the conditions which led to the design of the tapping machine illustrated herewith it may be well to consider the various common ways of threading articles on machines. Nuts are usually tapped by running through them a tap having a long, thin shank, on which the nuts collect. When the shank is full the tap is removed from the machine and the nuts are then slipped from the back end. There are, however, a large number of articles which cannot be tapped in this way,



The National Machinery Company's 1½-Inch Four-Spindle Reversing Tapper.

and it is necessary for various reasons to back out the tap. Any piece which is to be threaded with a taper, which includes nearly all pipe fittings, must have the tap backed out, and the same is true of articles which are not to be threaded clear through. It is apparent that if a tap is to be reversed it must be driven by a lead screw of the same pitch as the tap, that the tap may not grind around in the hole after it has cleared the threads. Furthermore, when a positive feed through a lead screw is employed some means of relief is necessary which will yield in case the tap misses the hole and strikes solid metal, as otherwise the machine might be injured. Adjustments should be provided for varying the speed and the distance which the taps will move, for cutting threads of different pitches, for running right or left hand, and means must be provided for quickly and automatically reversing the taps at any desired position.

In bringing out this tapper the National Machinery Company, Tiffin, Ohio, has attempted to meet these various requirements and to provide a machine of stiff construction with ample wearing surfaces. The general design is shown in the half-tone. Three pulleys—a driving pulley, a reversing pulley and an idler pulley—are carried on the horizontal shaft at the top. Next to the pul-

leys is a cone of gears, by which the speed of the tapping spindles may be easily regulated. Below the pulleys, and carried on the overhanging arm, is a set of levers, by which the machine is automatically reversed at any desired position and then brought to rest with the taps in their highest position. Each tap spindle is equipped with a relief device, which can be so adjusted that any pressure on the tap within reasonable limits will cause it to yield. Each spindle carries a removable sleeve lead screw, which can be selected to suit the pitch of the tap. The tap spindles are revolved for either right hand or left hand threads by throwing in one or the other of the bevel pinions shown on the top of the machine.

The table is machined on top and is equipped with tee slots for clamping the jigs which hold the work, and is easily adjustable in hight. A system of forced lubrication is used, which oils and cools the tap and carries away the chips into a removable chip pan.

The operation of the tapper is as follows: When the machine is at rest and the taps are in their highest position the work is secured in jigs which are located on the table; the hand lever is then thrown to the left, throwing the belt on the driving pulley and setting the machine in motion; the taps rotate and descend at the same time, tapping the work until a definite position is reached, at which point they automatically reverse and back out of the holes which they have just threaded; as soon as they reach their highest position the belt is automatically thrown onto the idler pulley and the machine comes to rest. New work is then secured in the jigs and the operation is repeated.

The machine illustrated occupies a floor space of 6 feet 5 inches by 3 feet 3 inches and has a net weight of 3000 pounds. The manufacturer is prepared to furnish jigs for holding any class of work which it is desired to tap on this machine.

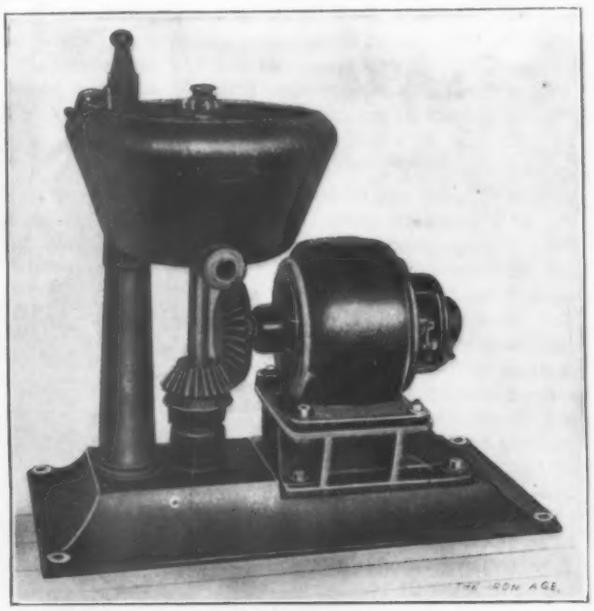
The Brown Wire Wound Gun Tests.

The tests of the 6-inch Brown segmental wire wound gun, 50 calibers long, now going forward at the Government proving grounds at Sandy Hook, are said to have been so successful that it is claimed a new world's record for heavy ordnance is assured. The Board of Ordnance and Fortification some months ago made an allotment of $41,000 to build and test one of these guns with 250 rounds of ammunition. The New York *World* states that six rounds have already been fired. The initial round, with 32 pounds of powder, produced an initial velocity of 1913 feet per second. The weight of the charge was increased thereafter, until with 64 pounds of powder a velocity of 3178 feet per second was obtained, with a pressure of 33,450 pounds per square inch. The tests, which are made with smokeless powder, will be continued until 250 rounds have been fired. The velocity attained with the charge in the test of December 7 already establishes a new world's record for this type of gun. It is expected that a velocity of 3500 feet per second will be attained with a pressure of from 43,000 to 45,000 pounds per square inch. It is stated that the gun will safely withstand the above pressure of 45,000 pounds per square inch, and that consequently the velocity of 3500 feet per second, which will establish a new world's record, is assured.

The Duty on Machinery Parts.—Final hearings were held last week before General Appraiser Fischer to determine the correct classification for duty of parts of machinery imported by Thomas Prosser of New York. The articles are of two different classes. One set is composed of forgings and the other of castings, but in each case the articles have been more or less advanced by machine work from the condition of plain castings or forgings. On this basis they have been assessed at 45 per cent. as manufactures of metal, and the contention of the Government is that this classification is the correct one. The importers claim that the forgings are dutiable as forgings at 35 per cent., regardless of the fact that they are not in the condition in which they left the forge, and that the castings are dutiable at 8-10 cent a pound, although it is admitted that they are not in the condition in which they left the molds.

A Motor Driven Centrifugal Oil Separator.

The centrifugal oil separator shown in the accompanying illustration was designed by the American Tool & Machine Company, Boston, Mass. It is intended especially for use in shops where oil is used as a lubricating or cooling agent on machines, such as screw cutters, &c., where it finally reaches the same drip pan as the chips and turnings. This equipment by centrifugal force separates from the chips and turnings oil which ordinarily



A Centrifugal Oil Separator Built by the American Tool & Machine Company.

is wasted, as it cannot be more than partially recovered by draining.

The material from which oil is to be extracted is placed in a removable metal pan, having sloping sides and a bronze sleeve which surrounds the spindle to prevent oil from leaking around it. This pan is fitted into a similarly shaped casting and securely fastened to the spindle. A circular top is screwed down over the pan containing the oil soaked scrap to within 1-16 inch of its brim. When the machine is started up the inner pan revolves with the spindle and centrifugal force drives the oil up the sloping sides until it flows through the opening between the pan brim and the lid. It then falls upon the inside of the outer casing and drains off through an outlet which is shown in the illustration.

It ordinarily takes from five to eight minutes to separate the oil from 750 cubic inches of material, which is the capacity of a machine of this size. Oil thus recovered can be used over and over almost indefinitely. There is, of course, some waste, but this is small in comparison with the amount lost where no separator is used.

In the equipment shown a 1 horse-power Crocker-Wheeler motor is used to furnish the required power. It runs at 1250 revolutions per minute, and drives the spindle of the separator through bevel gears at 1800 revolutions per minute.

The annual meeting of the Milwaukee Foundrymen's Association will be held this month, and plans have been made to combine with it a dinner at one of the city hotels, invitations to which will be confined exclusively to members of the association and the Metal Trades Association. Labor conditions in Milwaukee are quiet, with no prospect of trouble. The open shop idea prevails as far as the metal trades are concerned.

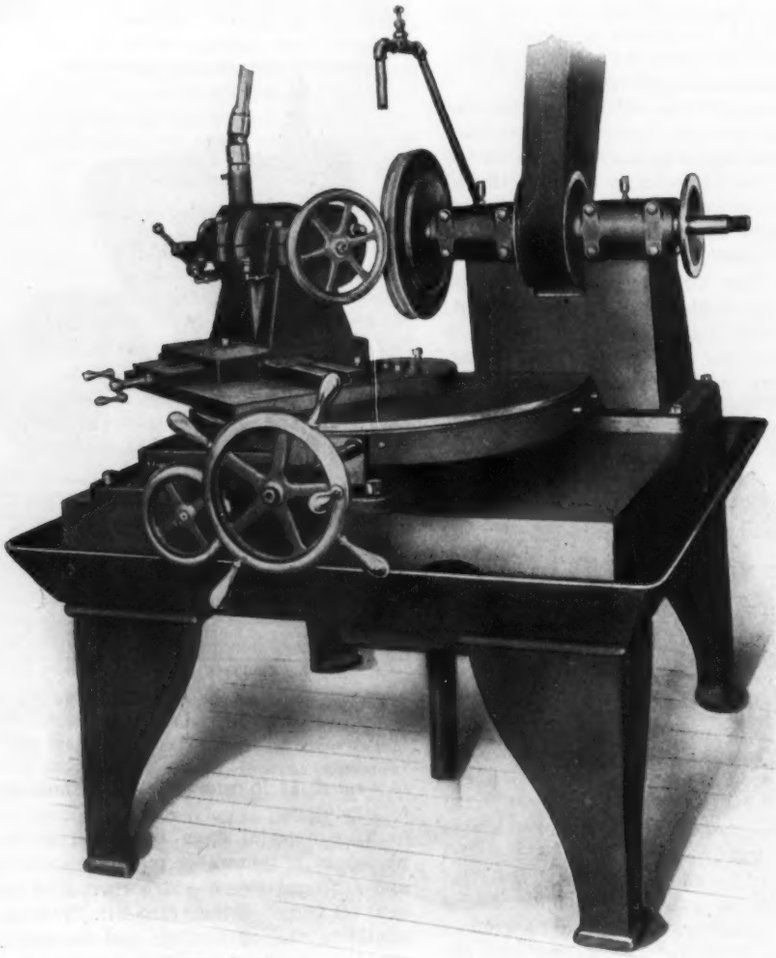
The Lodge & Shipley Hand Wheel Grinding Machine.

The grinding machine shown in the accompanying illustration was designed by the Lodge & Shipley Machine Tool Company, Cincinnati, Ohio, for finishing the rims of hand wheels from the rough at one operation, ready for buffing, without previous machining.

The bed proper is a planed casting 3 feet 7 inches by 3 feet 5 inches, which is mounted upon a cast iron pan on legs. The grinder head is fixed upon the bed plate at the right hand rear corner, and is driven by belt from the main countershaft. In front of the grinder head is a dovetailed guideway, having a 17½-inch bearing surface for the swivel slide. This swivel slide has a cross feed of 13 inches to and from the grinder head through the hand wheel seen at the left in front. Upon this slide is mounted a swinging plate, having its center fixed to the swivel slide, so that it coincides with the central plane of the grinding wheel. A rotary movement is provided for the swinging plate through the pilot wheel shown at the front. The head block carrying the hand wheel to be ground has two adjustments on the swinging plate at right angles to each other, so that the spindle holding the hand wheel may be shifted axially or transversely. The hand wheel while being ground is driven through a universal jointed shaft from a variable speed countershaft.

In setting a wheel for grinding the two adjustments of the head block are manipulated until the circle through the center of the cross section of the rim is tangential with a vertical line through the pivotal center of the swinging plate. The cross feed of the swivel slide is then advanced until the work comes in contact with the grinding wheel. By operating the pilot wheel the work may then be ground to a true circular arc of 180 degrees, starting with the hand wheel at right angles with the grinding wheel on one side of it and finishing at right angles with it on the other side. It will be seen that the extent of the adjustments permits the grinding of wheels of widely differing diameters with rims of almost any diameter in cross section.

Cooling water is delivered over the grinding wheel while the tool is in operation through a pipe leading from a small pump, which draws its supply from the catch basin around the bed plate, so that the water is circulated continuously. In grinding certain hand wheels on the machine the time ordinarily required, one hour, was reduced to nine minutes.



The Lodge & Shipley Hand Wheel Grinding Machine.

The directors of the Austrian-Hungarian States Railway Company of Budapest have decided to introduce modern improvements at its large iron and steel works at Resicza and Anina, Hungary. The blast furnace and coke oven plants are to be reconstructed by Fritz W. Lüermann of Berlin. The proposed improvements are to include new rolling mills, a producer plant, heating and annealing furnaces and accessories of the most modern description. This new machinery is to embody all the latest improvements which have given good results in practice. A special feature will be the use of labor saving appliances. The projected improvements of this important company are attracting the attention of metallurgical engineers on the Continent, more especially as they include a plant for running the metal direct from the blast furnaces to the steel works, whereby a very considerable reduction in the cost of production of steel will be secured.

The Outlook for Tariff Revision.

Indications Point to Extra Session Next October.

WASHINGTON, D. C., December 13, 1904.—The developments of the first week of Congress with regard to the possible revision of the tariff in the near future have been of very decided importance and indicate that throughout the session a vigorous contest will be waged between those who favor a thorough overhauling of the schedules and those who are firmly convinced of the wisdom of the "stand-pat" policy. Summing up the situation to-day, it may be said that tariff revision sentiment in Congress has lost ground since the two houses met and that the President himself has been weakened in his belief that there is a general demand for immediate revision by the country at large.

President's Message Modified.

An incident of the past fortnight heretofore unpublished sheds considerable light upon the present status of the tariff question in Congress. When the President prepared the first draft of his message and caused printed copies to be distributed to the daily papers of the country through the press associations, to be held in confidence until released upon presentation to Congress, the document contained a highly significant statement with regard to the tariff to the effect that the question was one of great importance, upon which the President proposed soon to send a special message to both houses. It was intimated that members and Senators should hold themselves in readiness to attend upon an extra session to be called soon after the adjournment of the present session in March. This reference to the tariff question was exhibited by the President to the members of his Cabinet and to a few Senators who called upon him during the week before the convening of Congress. The Senators, who included the leading members of the Finance Committee, at once urged him to strike out all reference to the tariff in order that neither the Administration nor the Republican leaders in Congress should be embarrassed by an utterance that would be accorded great significance throughout the country and might have a disturbing effect upon many important industries. After considering the matter for several days the President yielded the point, and corrections were sent by telegraph broadcast over the country canceling that part of the message referring to the tariff. As a result the only mention of the subject contained in the message as delivered to Congress and published in the daily press was a brief paragraph suggesting that the Dingley rates on Philippine products be reduced.

Still Believes in Tariff Revision.

Although the President modified his message in deference to the views of the so-called "stand-pat" Senators it can be stated on the highest authority that his sole purpose was to afford an opportnity for further discussion of the question before taking significant action. He is still of the opinion that the tariff should be revised at an early date and that one of the most important deductions to be made from the results of the recent elections is that the people at large desire that the tariff shall be "revised by its friends" without unnecessary delay. At the same time the President is seriously in doubt as to the advisability of calling Congress together in the spring and does not hesitate to say so. A few days ago, when a delegation from Louisville, Ky., invited him to spend a few days in that city next May, he replied that it would give him pleasure to do so, "provided there is no extra session of Congress, a question upon which my mind is not yet made up."

The fact that the President was induced to change his message at the last moment has now become pretty well known in and about Congress and affords much encouragement to the "stand-pat" element and especially to those Senators whose arguments it is believed induced the President to change his mind. As a result a definite plan has been put on foot to stave off a possible extra session in the spring by urging the President to defer further consideration of the subject until after the inauguration on March 4, with a view to postponing the extra session, if one must be held, until fall. It is urged in this connection that if the subject should be taken up in March, without opportunity for any preliminary work by the members of the Ways and Means and Finance committees, it would be impossible to complete a satisfactory tariff bill and pass it before the middle of July, and the fact is cited that the Dingley act, which was drafted at an extra session, did not become a law until July 24, 1897. Should the extra session be postponed until fall the tariff leaders of both houses, it is suggested, would be able to prepare themselves in advance, and a two months' extra session, beginning about October 1, would be sufficient to complete and pass a bill. If necessary the usual authority could be given to the Ways and Means and Finance committees to meet during the recess, and thus the tariff experts would be ready to proceed very promptly after reassembling in special session.

Advantages of an October Session.

Of course the fact should not be lost sight of in this connection that, as intimated, many of those who are urging the President not to call Congress together until October are very hopeful that long before the time for issuing the proclamation arrives they will be able to induce him to believe that there is no occasion for "meddling with the tariff." There are others, however, who sincerely believe that the tariff should be revised, but that much time would be wasted should both houses of Congress be called together in March to take up the work. It is obvious that for several weeks, if not months, the work of drafting a bill would be confined to the two committees, while both houses would adjourn from day to day without accomplishing any work whatever. The expense of an extra session amounts to several thousand dollars a day, and the taxpayers would be called upon to foot a very large bill, which might be materially cut down should the extra session be postponed until fall.

Tariff Commission Bills.

While the ultra-conservative element in Congress is thus energetically laboring to defer tariff revision, and if possible to prevent it altogether so far as the Fifty-ninth Congress is concerned, the revisionists are also hard at work and declare that unless the tariff is overhauled in the next Congress "the people will see to it that the Republican party is relieved of responsibility for future legislation." The first day of the new session witnessed the introduction of two important measures for tariff revision by prominent Republican Representatives from the Northwest, who claim to speak for practically all of their constituents. Messrs. Spalding of North Dakota and Fordney of Michigan introduced bills authorizing the appointment of tariff commissions to sit during the Congressional recess next summer for the purpose of considering the general subject of readjusting the rates of duty provided by the Dingley act. Mr. Spalding's bill authorizes the President, on or before March 6, 1905, to appoint a commission of nine members, to which no person "engaged or interested in the manufacture of any protected article," or who is a member of either house of Congress after March 4 next, shall be eligible to membership, who shall make to Congress final report of the result of its investigations on or before the first Monday in December, 1905, including its recommendations of any changes it may deem desirable to make in the present tariff schedules.

The measure presented by Mr. Fordney authorizes the appointment of a commission of ten Republican members of the House of Representatives, whose duty it shall be to report in December, 1905, what legislation, if any, is desirable to change the existing tariff laws of the United States. This commission is to work without compensation except for actual necessary expenses. It is understood that Mr. Fordney's plan would involve the appointment of the Republican members of the Ways and Means Committee to serve on the commission. This proposi-

tion, therefore, amounts to granting authority to the majority members of the Ways and Means Committee to sit during the recess next summer and formulate a tariff bill.

Leaders Object to Commissions.

The members of the Ways and Means and Finance committees are very tenacious of their prerogatives with regard to tariff legislation and point out with some force that he Spalding bill would relegate the subject to a commission composed entirely of experts in private life, as it is expressly provided that no Member or Senator shall be appointed to the commission. The further provision that persons "engaged or interested in the manufacture of any protected article" may not serve on the commission is criticised as likely to bring about the appointment of a body of theorists possessing no practical knowledge of the tariff question either from a commercial or legislative standpoint. Mr. Spalding replies to these criticisms that he is not wedded to any particular feature of his bill, but is simply anxious that the important subject of tariff should receive early and adequate attention and that it should not be permitted to block the proceedings of Congress at a regular session. The evident preference of both Senators and Congressmen for the Fordney measure induces many of the revisionists to believe that the present Congress will authorize both the Ways and Means and Finance committees to meet during the coming recess, either separately or jointly, and that after the tariff schedules have been examined in detail and amendments carefully considered the President will summon an extra session in September or October to enact a comprehensive tariff law. W. L. C.

Notes on Hydraulic Packings and Stuffing Box Design.

BY ULRICH PETERS.

In almost every industry the use of hydraulic apparatus for transmitting power by means of water or other liquid under pressure is increasing. The tendency to use higher pressures is also increasing, the limit depending upon the efficiency of the hydraulic packing in most cases. The expense of maintaining the packing—*i. e.*, wear and tear—increases more than proportionately as the pressure is increased. The purpose of this article is to describe several constructions of hydraulic cylinder and plunger packings and their practical applications, and, with the aid of collected results derived from experience, to give data and hints for selecting and designing satisfactory packing for parts moving under hydraulic pressure.

In general there are two different ways of applying a packing to hydraulic apparatus: either the packing is placed in the cylinder or in the plunger. The first is often called cylinder packing, or stuffing box or gland packing, and the other, ram, plunger or piston packing. Cylinder packings have the advantage of easy access and that defects are immediately noticed by the leaking of the liquid, which can be stopped generally by some outside adjustment without interfering with the operation of the apparatus. The second class of packing generally gives more trouble in respect to inspection and repairs. In practice, therefore, this kind of packing has been eliminated as much as possible, only being used for double acting plungers or in cylinders under very high pressures, where a double packing is essential. The preference in the latest practice is for two opposed single acting cylinders with outside gland packing instead of one cylinder with stuffing box and inclosed piston packing.

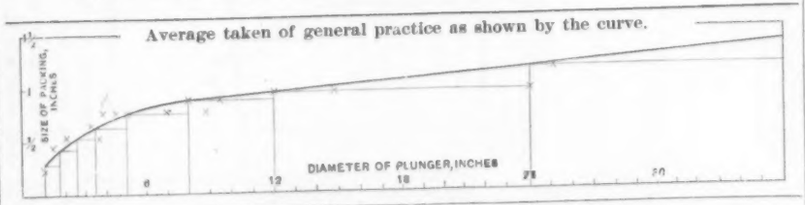
A packing can be adjusted either through mechanical means, such as a gland with adjusting nuts on stud bolts, &c., or automatically by the internal hydraulic pressure. There is, therefore, another classification possible—mechanical cylinder and plunger packings, and automatic cylinder and plunger packings, or both combined. The mechanical packings have the disadvantage that the gland is often tightened too much, thereby compressing the packing more than necessary, causing loss of power through excessive friction in the stuffing box and wear on the packing material. The automatic packings, on the other hand, are more economical in this respect, as they are compressed in proportion to the hydraulic pressure, so that when the pressure relieves the packing a great amount of friction will be saved which would be otherwise lost. Where there is always constant pressure, as, for instance, in accumulators, the mechanical packings will do well, but in case of varying pressures the automatic packing should be given the preference. The materials used for packing vary considerably in character, the usual ones being hemp, cotton, rubber, leather and metals. Leather as packing should be used for cold liquids only.

The Stuffing Box.

Stuffing boxes are used more than any other mechanical means for fibrous packings. Mechanical cylinder packings are shown in Figs. 1, 3, 5 and 14, and automatic cylinder packings in Figs. 2, 3, 4 and 6. The packing material usually to be had on the market is square in section and of hemp or cotton, or sometimes leather, rubber, or waste laid in tallow. The stuffing box may be said to belong to a class of machine details the preliminary dimensions of which cannot be determined by theory alone. To obtain practical data a selected number of satisfactory stuffing boxes as made or recommended by various authorities are here tabulated:

Maker.	Where Used.	Unit Pressure pr. sq. in.	Dia. of Plunger.	Packing.		Gland.			Bolts.			Position of Cylinder and General Remarks.
				Thickness.	Depth.	Length.	Thickness.	Diameter	Circle.	Number.	Diameter.	
		p	D	A	C	E	F	H	G	n	d	
Whitworth	Hydraulic governor.	8,000	1	$\frac{3}{16}$	$2\frac{1}{4}$	$1\frac{1}{4}$	Sleeve Nut Gland					Vertical, guided in glands.
Whitworth	Lifting cylinder.	2,500	$3\frac{1}{2}$	$\frac{3}{4}$	$3\frac{3}{4}$	2	1	9	$6\frac{1}{2}$	6	$\frac{7}{8}$	Vertical, guided in glands.
Whitworth	Racking cylinder.	2,500	$3\frac{1}{2}$	$\frac{3}{4}$	$5\frac{1}{4}$	$1\frac{1}{4}$	$1\frac{1}{6}$	$9\frac{1}{2}$	$6\frac{1}{2}$	4	$1\frac{1}{8}$	Horizontal in guides.
Whitworth	Crane cylinder.	2,500	$7\frac{7}{8}$	$\frac{7}{8}$	8	$2\frac{1}{2}$	$1\frac{1}{2}$	$13\frac{1}{2}$	$11\frac{1}{2}$	9	$1\frac{1}{8}$	Vertical, guided in glands
Am. Machinist	Flanging press.	1,500	40	$1\frac{1}{2}$	6					14	$1\frac{3}{4}$	Vertical in guides.
J. Kennedy and S. V. Huber & Co	Standards.	500 to 1,000			6 × A + $\frac{1}{16}$"							Vertical or horizontal, ram in guides.
Tyrone Foundry & Machine Co	Intensifier.	2,000	4	$\frac{5}{8}$	$4\frac{1}{8}$		$\frac{11}{16}$		7	6	$\frac{3}{4}$	Horizontal, ram in guides
Tyrone Foundry & Machine Co	Intensifier,	600	$7\frac{7}{16}$	$\frac{5}{8}$	$4\frac{1}{8}$		$\frac{11}{16}$		$10\frac{5}{8}$	6	$\frac{3}{4}$	
Mackintosh, Hemphill & Co.	450 ton Hydraulic Shear.	500	48	$1\frac{1}{2}$	6	3	3	5'—0"	4'—7"	16	2	Vertical, guided in glands

In comparing the above stuffing boxes some discrepancies in proportions of dimensions can be noticed for about the same size of plungers. When designing a stuffing box such as shown in Fig. 1 the first question that arises is, very naturally, what is the proper size, A, and length, L, of packing for a given diameter, D, and hydraulic pressure unit, p. After determining this, as demonstrated in the tabulated form of investigation, the proportioning of the other stuffing box dimensions will not be difficult, as it can be based on purely mechanical theories as carried through in the following example on the most commonly used stuffing box, Fig. 1:

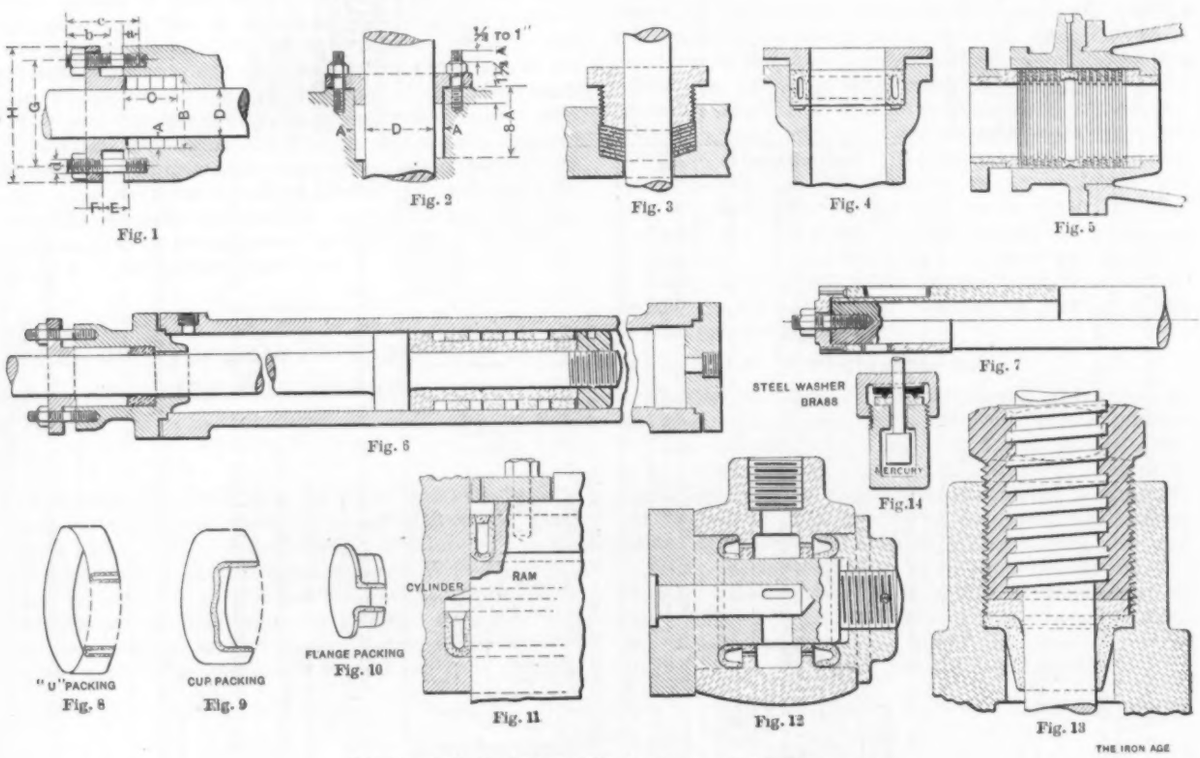
Stuffing Box Dimensions.	Elements and Conditions upon which it depends.	Method used in Adopting Rules for Deriving Empirical Data and Formulæ.	Formulæ for Stuffing Box Dimensions. Data taken from practice	Formulæ Derived. Theoretically.	Formulæ Derived. Empirically.	Remarks
Thickness A of Packing.	Heavy packing is costly and increases the size of Gland and Stud Bolts. The majority of packings now used are square; it would be difficult to bend heavy packing around a small plunger and the time of wear is not in proportion to cost. For that reason only it is better to adopt light size packing and renew the same oftener. As the size A is practically independent of the pressure unit it should be made in proportion to diameter D.	Average taken of general practice as shown by the curve. 	Plunger. Packing $D=1$ to $1\frac{3}{4}$ $A=\frac{1}{4}$ $D=1\frac{3}{4}$ to $2\frac{1}{4}$ $A=\frac{5}{16}$ $D=2\frac{1}{4}$ to $3\frac{1}{2}$ $A=\frac{1}{2}$ $D=3\frac{1}{2}$ to 5 $A=\frac{5}{8}$ $D=5$ to 8 $A=\frac{3}{4}$ $D=8$ to 12 $A=\frac{7}{8}$ $D=12$ to 25 $A=1$ $D=25$ to 39 $A=1\frac{1}{4}$ $D=40$ & over $A=1\frac{1}{2}$	$B=D+2A$		
Length L of Packing.	A multiple m of the square packing size A, proportional to pressure p and working conditions the plunger and cylinder are subjected to, *i. e.*, whether vertical or horizontal, well guided, eccentrically loaded and liquid filtered.	Average taken of general practice given in table. Unit Pressure p in pounds, per square inch. 500 1500 3000 8000 Position of cylinder .... Horz Vert. Horz. Vert. Horz. Vert. Horz Vert. Length of packing, m = 5 to 6 4 to 6 6 to 8 4 to 8 7 to 10 5 to 10 7 to 12 6 to 12 Take the respective lowest value of multiple m in case the plunger is provided with guides, and the highest value from table where the plunger is guided in the glands only, not loaded centrally, and the water not filtered.		$L=mA.$		
Depth C of Stuffing Box.	Length of packing L.	To give the gland a start in the stuffing box, the required number of new packing rings placed in the box should not quite fill it up			$C=L+\frac{1}{8}$ to $\frac{1}{4}$ $=mA+\frac{1}{8}$ to $\frac{1}{4}$	Take about $\frac{1}{8}$" for $A=\frac{1}{4}$ to $\frac{3}{8}$ and $\frac{1}{4}$" for $A=\frac{7}{8}$ to $1\frac{1}{2}$"
Total Pull P on Stud Bolts.	Size of packing A, hydraulic pressure unit p, diameter of plunger or ram D, and friction in glands.	Assumed, that the difference of packing friction between the surface of stuffing box in cylinder and that of the plunger will in average cases compensate for the gland friction. Under above supposition, simply the total pressure on the packing area will strain the stud bolts.		$P=\frac{\pi}{4}\left(B^2-D^2\right)p$ or $P=\pi A\,(D+A)p$		
Number n and Diameter d of Stud Bolts.	Total pull or tension P on stud bolts.	Combined area of stud bolts at root of thread × allowable stress per square inch = total pressure on packing. Table of Combined Areas of Stud Bolts at Root of Thread. Dia. of Bolt. 1 Bolt. 2 Bolts. 3 Bolts. 4 Bolts. 6 Bolts. 8 Bolts. 12 Bolts. 16 Bolts. $\frac{1}{2}$ 0.126 0.252 0.378 .... $\frac{5}{8}$ 0.202 0.404 0.606 0.808 .... $\frac{3}{4}$ 0.302 0.604 0.906 1.208 1.812 .... $\frac{7}{8}$ 0.420 .... 1.260 1.680 2.520 3 360 .... .. 1 0.550 .... 3.300 4.400 .... $1\frac{1}{8}$ 0.694 .... 4.168 5.552 8.328 .... $1\frac{1}{4}$ 0 893 .... 7.144 10.716 .... $1\frac{3}{8}$ 1.057 .... 8.456 12.684 16.912 $1\frac{1}{2}$ 1.295 .... 15.540 20.720	Number of stud bolts × area at root of thread. (See table) × allowable stress S = total pressure resulting from annular area of packing under hydraulic pressure, or $n \times \text{area} = \frac{P}{S}$		Allow for the stress S in stud bolts according, to material. $S=5000$ to 10,000 pounds per square inch. On larger cylinders groove the stud bolts, so that if they break at that place a new bolt can be easily set in.
Bolt Circle G.	Diameter B of stuffing box, diameter d of stud bolt and material of cylinder.	To avoid breaking out the stuffing box near the tap holes the stud bolts should not be located too close to the stuffing box.	Place center of taphole to box 1 to $1\frac{1}{4}$ d for cast iron, 0.75 to 1 d for steel casting, 0 6 to 0.75 d for steel.		Cast iron cylinders $G=B+2d$ to $2\frac{1}{2}d$ malleable iron cyl. $G=B+1.5d$ to $2\,d$ steel cylinders $G=B+1.2d$ to $1.5d$	Same applies to outside diameter of stuffing box in cylinder.
Outside Dia. of Gland Flange H.	Stud nut diameter.	Stud nuts should have ample bearing surface on the flange.	Distance from center of bolt hole to outer gland edge = 1 to $1\frac{1}{4}d$		$H=G+2d$ to $2\frac{1}{2}d$	
Thickness F of Gland.	Bending moment by stud bolts.	The maximum bending moment around the gland will be at diameter B, so that approximately $P\left(\frac{G-B}{2}\right)=\frac{\pi\,B\,F^2}{6}S_1$		$F=\sqrt{\frac{3\,P\,(G-B)}{\pi\,B\,S_1}}$		For cast iron or brass glands the fiber stress should not exceed $S_1=2000$ to 3000 lbs.p. sq.in.
Length E of Gland.	Amount of compressing the packing before removing or inserting new packing rings.	In practice, as a rule, the packing should not be worked down above half the packing length L with one filling			$E=\frac{L}{2}$ or less.	
Length a of Stud Tapping.	Shear in threads.	Standard tap depth.			$a=1.5\,d.$	
Length c of Stud over all.	Total hight of gland, hight of nut and length of stud in tap hole.	To start a new packing the stud bolts above the cylinder should be of sufficient length.			$c=a+E+F+d$	
Length of Threading b	Length of gland E.	To be able to use the full length E of gland for compressing the packings, it is evident that the length of unthreaded part on stud bolt should be less than the flange thickness F.	Length of unthreaded part about $=F-\frac{1}{4}d.$		$b=E+\frac{5}{4}d.$	

Other Types of Hydraulic Packings.

In the automatic stuffing box, Fig. 2, only sufficient packing should be inserted to permit the gland to make contact with the cylinder, as shown. The bottom of a fibrous packing box should always be square and not beveled, as leakage is apt to take place around the outside of the packing, even though the gland be more than tight enough to stop leakage around the plunger rod. Also shreds of packing are more liable to get into the cylinder and clog the small apertures if the box is beveled at the bottom. Fig. 3 represents a semiautomatic packing for smaller rods, consisting of leather ring disks. Fig. 4 is also self packing, and the material consists of a hollow rubber ring with several small holes at the bottom. It is claimed that the loss by friction with this packing is over 50 per cent. less than by the solid stuffing box, Fig. 1. Stuffing boxes of the types Figs. 1 to 4, inclusive, work fairly well even under a pressure up to 1500 pounds per square inch. Fig. 5 shows another example of solid packing for pressures not over 500 pounds. The box consists of a number of leather and brass rings with forced oiling in the center. This packing is more expensive, but the wear is very small, and the leather will keep in good running order for years in many cases. Fig. 6 is a double acting cylinder with self packing stuffing box and solid plunger packing for 2500 pounds pressure. In Fig. 7 are shown automatic plunger packings. The upper half in sketch is for 7000 pounds pressure and the lower half for 3000 pounds pressure.

When it is desired to have the least amount of friction in the operating of a hydraulic plunger under high pressure up to 7000 pounds rawhide packings of the principal forms shown in Figs. 8, 9 and 10 are used to a great extent. The position of the "U" packings, Fig. 8, in practice depends upon the conditions, and may be either in a groove at the upper end of the ram and at the lower end of cylinder, Fig. 11, or used as shown in the swivel joint, Fig. 12. When for any reason it is not desired to use the outer lip of the packing, as, for instance, on plungers or valve stems, the resulting form is known as a cup packing, Fig. 9, and when the inner lip is used then we have the hat or flange packing, Fig. 10, of which a very common application is shown in Fig. 13. A fibrous packing will last three to twelve times longer than a leather packing when much in use, but the power lost by friction with leather packings will be only about $4/D$ per cent. of that for fibrous packings. With large "U" packings, especially on horizontal cylinders, it is often necessary to place a ring in the "U" to prevent it from collapsing. Fig. 14 represents an excellent form of metallic packing for a ¼-inch mercury gauge stem.

Recent Supreme Court Decision Will Relieve the Appraisers.—The files of the Board of United States General Appraisers will be cleared of nearly 20,000 suspended protests within a month or six weeks by the decision of the Supreme Court last week in two of the most important customs cases, in point of magnitude at least, which have come before it since the constitutionality of the Dingley law was tested. The cases were known as the sugar test case and the lace neckwear case, and were in each instance decided adversely to the importers. The decision in the sugar test case will release about 15,000 protests involving the same issue, for disposal by the board, and the lace neckwear decision will release between 3000 and 4000 protests. It will probably be necessary for the board to have an extra force of clerks for about a month to get rid of this accumulation of work. The issue in the sugar test case was whether, in determining the saccharine strength of sugar for customs purposes, the Government should continue to use the exact scientific method, or adopt the rough and ready method in general commercial use. In the lace neckwear case the issue was whether merchandise of this description was dutiable at 60 per cent. as lace wearing apparel, or at 50 per cent. as cotton neckwear. The disposition of these two issues will have a beneficial effect on the general business of the board, as much of the time of the General Appraisers was devoted to the routine hearing of new protests on these questions and their assignment to the suspended files.



Details of Typical Hydraulic Packings and Stuffing Boxes.

The Common Council of Milwaukee has recently defeated a proposition to issue bonds for the establishment of a municipal electric lighting plant. The contract for the electric lighting of the city is now held by the Milwaukee Electric Railway & Lighting Company, which owns a very valuable plant in the city and upon which it is at present spending large sums of money in improvements and additions.

The Bursting of Four-Foot Fly Wheels.*

BY CHARLES H. BENJAMIN, CLEVELAND, OHIO.

Experiments made hitherto by the writer have been confined to the testing of wheels whose diameters were 2 feet and less. The interest taken in these experiments seemed to warrant carrying them further on a larger scale, such as would correspond with sizes actually in use. Four feet was selected as a limiting diameter, and a cylindrical steel casing was built having an internal diameter of 5 feet. The rim or shell was made of steel 1¼ inches thick, having a tensile strength of about 65,000 pounds per square inch. The upper and lower halves of the rim were flanged at the junction and bolted together by 1-inch steel bolts. The sides were of steel ⅜ inch thick, doweled to the rim and secured by through bolts outside and inside the rim. It was not deemed safe to conduct these experiments inside a building. The casing was therefore located just outside the building where the tests were to be made, in a pit or excavation lined with brick. The flanges of the lower half rested on brick piers and were bolted in place. The entire upper half of the casing could be hoisted up, giving access to the interior for setting or removing the wheels. The shaft carrying the wheel to be tested turned in bearings bolted to angle irons on the lower halves of the side plates and was connected to the driving mechanism just inside the building by a flexible sleeve coupling. After the wheel was in place the casing was lined with wooden blocks to absorb the momentum of the flying fragments. Instead of using a steam turbine, as in former experiments, the fly wheel shaft was speeded up by means of a Reeves variable speed countershaft, interposed between the line shaft and the driving shaft.

The first wheel to be experimented on was a well proportioned cast iron pulley, such as is used on shafting for transmitting power. It was 48 inches in diameter, had 6 arms and weighed 194 pounds. The rim was whole and was 8½ inches wide and about ⅜ inch thick, finished on the outside. The arms were elliptical in section, 3⅛ inches by 1 1-16 inches at the hub, and 2 inches by ¾ inch at the rim. On the whole the wheel was well designed and showed no signs of shrinkage strains. It had, however, been balanced in the customary manner by riveting a cast iron washer inside the rim at the lighter side, and this proved its undoing. The combination of a thin place in the rim, a rivet hole and a heavy mass of cast iron is enough to wreck any wheel. It was necessary to still further weight this side by winding lead wire around the arm just inside the rim. As has been shown by previous experiments on whole rim wheels of cast iron, a bursting speed of 400 feet per second may be reasonably expected.

The circumference of a 4-foot wheel being about 12½ feet, such a wheel should burst at about 32 revolutions per second, or 1920 revolutions per minute. The pulley in question burst at 1100 revolutions per minute, as recorded by a tachometer connected to the driving shaft.

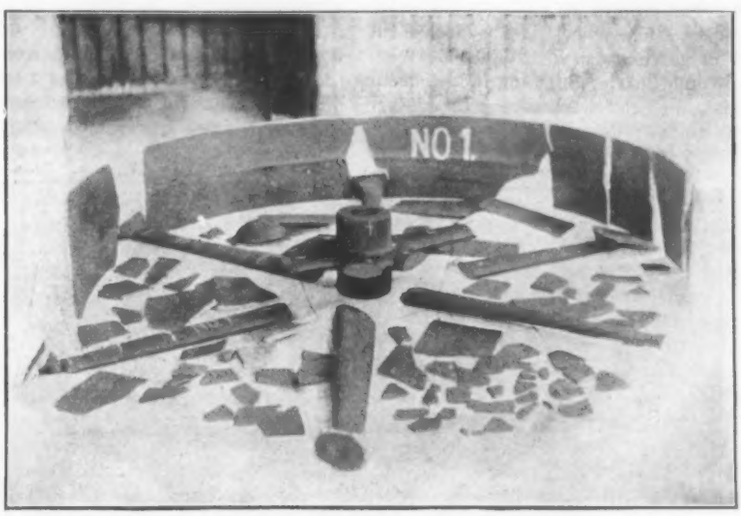


Fig. 1.—Fragments of Wheel No. 1.

Fig. 2.—Wheel No. 2 After Breaking.

* Abstract of a paper presented at the New York meeting (December, 1904) of the American Society of Mechanical Engineers.

The appearance of the wheel after breaking is shown in Fig. 1. The balance weight weighed 3½ pounds, and its center was approximately 23 inches from the axis of rotation. At 1100 revolutions per minute the centrifugal force of the balance weight alone would be 2760 pounds. Add this radial pressure at a weak point between the arms to that due to the weight of the rim itself, and the low bursting speed is easily accounted for. The linear speed of the rim at rupture was 230 feet per second. As 100 feet per second is considered the limit for belt speed, this pulley would have a working factor of safety of 5.3.

Wheel No. 2 is shown after rupture in Fig. 2. It was a cast iron pulley of the same general style and dimensions as No. 1, but with a split hub and rim, as may be seen from the cut. The balance weight was present, as in the former case, but was obliged to yield the palm to its rival, the flanged joint. The wheel had been cast in one piece, as is usual in such cases, with cavities cored at the joints of rim and hub. After finishing it had been broken apart by wedges, making a fracture joint. The flanges, being located midway between the arms and came midway between the rim joints and were bolted to plane faces on the polygonal hub. As shown in the cut, the rim was further reinforced by a system of diagonal bracing, each section of the rim being supported at 5 points on each side in such a way as to relieve it almost entirely from bending. The braces, like the arms, were of phosphor bronze, and all bolts and connecting links of steel. This wheel was designed by a Baltimore firm as a model of a proposed 30-foot fly wheel.

On account of the excessive air resistance it was found necessary to inclose the wheel at the sides between sheet metal disks before any great speed could be attained. Even then repeated trials failed to reach a speed of more than 800 or 900 revolutions per minute on account of the great inertia of the wheel and the consequent slipping of belts. By putting on more and wider belts, by a liberal use of Cling-Surface and with the aid of a 7½ horse-power electric motor belted on in parallel it was found possible to get a speed of 1650 revolutions per minute. After the wheel had been run at this speed inspection showed fracture of several of the I-shaped pris-

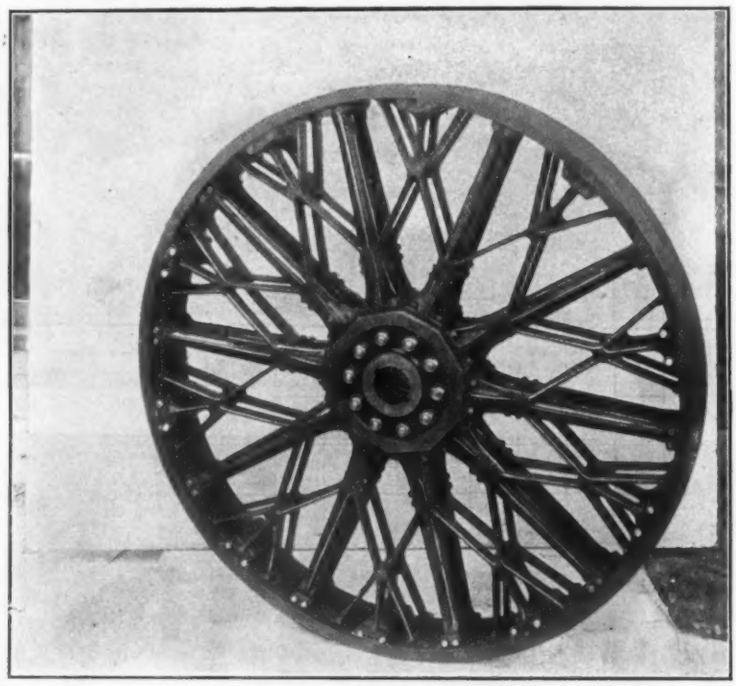


Fig. 3.—Wheel No. 3 Before Testing.

bolted at some little distance inside the rim, were in the worst possible position to withstand the bending action due to centrifugal force, and their own weight only aggravated the difficulty. The flanges shown in the foreground of the illustration weighed with their bolts 7½ pounds. This wheel burst at less than 700 revolutions per minute, the tachometer not recording below this speed, probably 600 revolutions per minute. At this speed the centrifugal force of the flanges on one side would have been 1680 pounds. At 600 revolutions per minute the linear speed of rim would be only 125 feet per second. At the very common belt speed of 4500 feet per minute the factor of safety would have been but 2.8, which is altogether too low, considering the nature of the material and the shocks to which a pulley may be exposed

Fig. 3 is from a photograph of wheel No. 3, taken just before setting in the case. It measured 49 inches in external diameter and weighed about 900 pounds. The rim was 6¾ inches wide and 1⅛ inches thick, and was built of 10 segments, the material being cast steel. Each joint was secured by 3 prisoners of an I-section on the outside face, by link prisoners on each edge and by a dovetailed bronze clamp on the inside, fitting over lugs on the rim. The arms were of phosphor bronze, 20 in number, 10 on each side and were a cross in section. These arms

oners on the outer surface of the joints, and a slight opening of the joints themselves, to the extent of perhaps 1-100 or 2-100 inch.

The casing was closed for the last time and the combination of driving mechanisms set to work. The observers were all well protected by the thick piers of the building, while other spectators were kept at a safe distance and well away from the plane of rotation. Two of the observers watched the pointer of the tachometer through opera glasses, another kept the time, while a fourth manipulated the driving levers. The hand of the speed counter reached and slowly passed the 1600 mark, crept slowly on, and as it quivered on the mark of 1775 there was a sudden crash, a sound of rending and tearing, and the writer saw the countershaft inside writhing on the floor like a wounded snake.

The steel rim of the casing was broken off short 6 inches below one of the flanges, and the entire upper half, weighing half a ton, was projected about 75 feet into the air and landed some hundred feet away on the campus. On its way up it carried away part of the cornice of the building, and this collision was probably what caused it to deviate so much from a vertical path. The hub and main spokes of the wheel remained nearly in *situ*, but parts of the rim were found 200 feet away, while one large fragment landed on the roof of the building. This sudden

failure of the rim casing was unexpected, as it was thought the flange bolts would give way first. The tensile strength of the rim at the point of fracture was about 1,200,000 pounds, or about four times the strength of the wheel rim at a solid section. Examination of the break in the casing showed a clean, bright fracture, with almost no imperfections.

The failure of the wheel itself was due to a gradual opening of the joints, occasioned by the fracture of the outside prisoners and to flaws in the bronze castings of the arms near their junction with the rim. On putting the pieces of the wheel together in their original order it was easy to locate the joint which first gave way, on account of the symmetry of the breaks either side of a diameter through this point. It is but fair to the builders of the wheel to say that the fractures showed uniformity of strength and of workmanship, since there was hardly a member or a joint which did not fail in one part or another of the wheel. One thousand seven hundred and seventy-five revolutions per minute means a linear speed of rim of 22,300 feet per minute, or 372 feet per second. This is not as great as the probable speed of a solid cast iron rim of good design, but it is greater than the speed of any sectional or jointed rim which has been tested. The tensile stress due to the centrifugal force at this speed is 13,800 pounds per square inch. This shows that the joints were much weaker than the solid rim. On the whole the test of this particular wheel was disappointing, since its strength was not sufficient to repay one for the expense of the design.

The apparatus for the experiments was designed and put in position by Moulton & Wachalofsky, members of the class of 1903, Case School of Applied Science, and the tests on wheels Nos. 1 and 2 were made by them. For the experiments on the last wheel credit should be given to Geo. E. Daniels, instructor in mechanical engineering.

It is interesting to compare the kinetic energy of the rim of the wheel at the recorded speed with the work of destruction. Assuming the rim with its lugs, flanges, &c., to weigh 300 pounds, which is a reasonable estimate, the kinetic energy at a speed of 372 feet per second would be 645,000 foot-pounds. Further assuming that none of the energy was dissipated in heat and that the combined mass of wheel and casing projected into the air weighed 1500 pounds, we find the hight of projection to be 430 feet. Four-fifths of the energy was dissipated.

The experiments just described make it clear that more than ordinary precautions must be taken to insure safety. The method adopted by an engineer in Germany for testing emery wheels seems well adapted for this purpose. It consists in mounting the wheel to be tested on the lower end of a vertical shaft and sinking the apparatus in a hole in the ground. The writer hopes to be able to make some experiments on large wheels during the coming year. A pit about 5 feet in diameter by 3 or 4 feet deep will be excavated in a gravelly soil, sheet piling being used to inclose the sides. The wheel will be fastened to the lower end of a vertical shaft, running on specially designed thrust bearings and driven by a friction speed controller at the top. A steam turbine will be used, since this is easier to regulate and less susceptible to injury than the electric motor.

The Uniform Bill of Lading.

The long continued protest of shippers against the proposed adoption of the uniform bill of lading, as formulated by the Uniform Bill of Lading Committee of the Central Freight Association, culminated last week in a meeting in Chicago, at which shipping interests from all over the country attacked, and railroad men defended, the proposed instrument, before a committee of the Interstate Commerce Commission. A leading part in the prosecution, if such it might be called, was taken by the attorney for the Illinois Manufacturers' Association and Chicago Shippers' Association, which bodies are to be credited with having stirred up the shipping interests of the country on this subject. The Interstate Commerce Commission was represented by Judson C. Clements of Georgia, Joseph W. Fifer of Illinois and C. A. Prouty of Vermont. At the end of the three days' session the sentiment prevailed very generally that, while the shippers had made an excellent case, the railroads had little or no case at all. To such an extent was this true that many railroads have already voluntarily notified their customers that they will not adopt the obnoxious bill of lading in its present form at least.

The two clauses of the bill that were most strongly opposed were, first and particularly, the one compelling the shipper to sign a bill of lading, making it virtually a contract, by which the shipper, in consideration of not being charged 20 per cent. advance in rate, relieves the railroad of its common law liability in the matter of loss or damage to merchandise carried. While the railroad attorneys successfully demonstrated that this 20 per cent. clause has been in practically all bills of lading used by American railroads for eight years, the shippers were able to prove that in no case had the clause been enforced, and that railroads had habitually and customarily paid damages embraced in common law liability to shippers who had not paid the 20 per cent. premium on their freight tariff. It was further shown that while the average expense to railroads for loss and damage to freight ranged from ½ of 1 per cent. to 1½ per cent. of the total freight earnings, the roads now proposed to charge 20 per cent. premium for assuming a liability that they had assumed all along. This 20 per cent. would be virtually, therefore, an increase in freight rates.

Another reason for objecting to this clause was the fact that it left a dangerous loophole for preferential rates to large shippers. In other words, while the 20 per cent. rate might be enforced with small shippers, the large shippers would, by reason of the great amount of tonnage which they had to offer, be able to secure immunity from the enforcement of the clause, giving them practically a rate 20 per cent. lower than their less powerful competitors.

Another objection to the proposed bill of lading was the printing of the words "not negotiable" across its face, and to this feature bankers were the chief objectors. The Bill of Lading Committee stated that this feature would not be enforced at all except in certain States in which State legislation had been enacted making it illegal for railroads to issue bills of lading that were negotiable.

Bankers testified that they could not legally advance money on a bill of lading bearing the words "not negotiable," even though there were printed in small type on the back of the instrument words practically nullifying the printed indorsement on its face. Closely interwoven with the feature of nonnegotiability was the one previously mentioned concerning liability of the shipper. For instance, a bank which was accustomed to advance up to 75 per cent. of the value of a shipment, under the prevailing usage, could not do so on the new bill except with large and responsible shippers, because the railroad would have no longer legal responsibility for loss of or damage to the shipment during transit. As an example: A car of grain containing 500 bushels, on which banks were accustomed to lending 75 per cent. of the market value of the grain, might easily in transit lose 20 or 25 per cent. of the original shipment, and where there was no recourse against the railroad for this loss, and the shipper was not responsible, the bank would lose a certain percentage of the money loaned. Here, too, the chief objection was that the large responsible shippers would have the advantage, because banks would feel safe in negotiating their bills of lading up to within a small margin of the actual merchantable value of the cargo, while the small unknown shipper would be deprived of that facility.

The meeting was adjourned to reconvene at Washington, D. C., December 15, and the railroads are disposed to push the matter to a conclusion before January 1, as it will have an important bearing on certain changes of rates which they purpose putting in effect on that date.

The American Brake Shoe & Foundry Company, New York, has moved its plant from Bloomfield and consolidated it with its plant at Mahwah, N. J.

Additional St. Louis Awards.

In the issue of *The Iron Age* of October 20, 1904, was published a list of St. Louis World's Fair prizes. That list covered only grand prizes and gold medals awarded for exhibits in the Machinery and the Mines and Metallurgy buildings. It was not quite complete and it also contained some errors. The additional awards enumerated below are official so far as the Exposition authorities are concerned, but are not yet certified by the United States Commission.

Machinery Building.

UNITED STATES, GOLD MEDALS.

The list of exhibitors securing gold medals should include the following:

Fairbanks, Morse & Co., Chicago.
R. Hoe & Co., New York.
Mietz & Weiss, New York.
New York Leather Belting Company, New York.
De Laval Steam Turbine Company, New York.
Acme Machinery Company, Cleveland, Ohio, was incorrectly given as Acme Harvesting Machinery Company.

UNITED STATES, SILVER MEDALS.

Acme Water Storage & Construction Company, New York.
Advance Pump & Compressor Company, Battle Creek, Mich.
Prof. G. I. Alden, Worcester, Mass.
American Balance Valve Company, Jersey Shore, Pa.
American Engine Company, Bound Brook, N. J.
American Pulley Company, Philadelphia, Pa.
American Stoker Company, Erie, Pa.
American Well Works, Aurora, Ill.
B. F. Barnes Company, Rockford, Ill.
Bashlin Company, Warren, Pa.
Baum Separator & Machine Company, Manheim, Pa.
Bertsch & Co., Cambridge City, Ind.
Geo. F. Blake Mfg. Company, New York.
Borden Company, Warren, Ohio.
Bradley Mfg. Company, Pittsburgh, Pa.
Brown Corliss Engine Company, Corliss, Wis.
Byrkit-Hall Sheathing Lath Company, Chicago.
W. P. Callahan & Co., Dayton, Ohio.
Cincinnati Milling Machine Company, Cincinnati, Ohio.
Cincinnati Shaper Company, Cincinnati, Ohio.
Clonbrock Steam Boiler Company, Brooklyn, N. Y.
Coates Clipper Mfg. Company, Worcester, Mass.
Consolidated Engine Stop Company, New York.
Cobden Machine Works, Cobden, Ill.
Cortland Corundum Company, Cortland, N. Y.
Curtis & Co. Mfg. Company, St. Louis, Mo.
De Laval Steam Turbine Company, New York.
Direct Separator Company, Syracuse, N. Y.
Downie Pump Company, Downieville, Pa.
E. & T. Fairbanks & Co., St. Johnsbury, Vt.
Fairbanks Company, New York.
Fairbanks, Morse & Co., Chicago.
Famous Filter Company, New York.
Foos Gas Engine Company, Springfield, Ohio.
Foote, Burt & Co., Cleveland, Ohio.
Walter H. Foster, New York.
Gould & Eberhardt, Newark, N. J.
Graton & Knight Mfg. Company, Worcester, Mass.
Greene, Tweed & Co., New York.
I. & E. Greenwald Company, Cincinnati, Ohio.
Hersey Mfg. Company, Boston, Mass.
Hilles & Jones Company, Wilmington, Del.
Hoffman-Carr Mfg. Company, Philadelphia, Pa.
Holmes Metallic Packing Company, Wilkes-Barre, Pa.
Houston, Stanwood & Gamble Company, Cincinnati, Ohio.
A. L. Ide & Sons, Springfield, Ill.
Kempsmith Mfg. Company, Milwaukee, Wis.
Lane & Bodley Company, Cincinnati, Ohio.
Lombard Governor Company, Boston, Mass.
Maryland Meter Company, Baltimore, Md.
Manzell Bros., Buffalo, N. Y.
Materne Mfg. Company, St. Louis, Mo.
Merrill Mfg. Company, Toledo, Ohio.
Metallic Flexible Tubing Company, Philadelphia, Pa.
Metric Metal Works, Erie, Pa.
Wm. A. Miller Elevator Mfg. Company, St. Louis, Mo.
Moran Flexible Steam Joint Company, Louisville, Ky.
H. Mueller Mfg. Company, Decatur, Ill.
Murray Iron Works Company, Burlington, Iowa.
F. E. Myers & Bro., Ashland, Ohio.
National Automatic Tool Company, Dayton, Ohio.
Neptune Meter Company, Newark, N. J.
Niagara Machine & Tool Company, Buffalo, N. Y.
W. H. Nicholson & Co., Wilkes-Barre, Pa.
Wm. W. Nugent & Co., Chicago.
Pedrick & Ayer Company, Philadelphia, Pa.
Philips Pressed Steel Pulley Works, Philadelphia, Pa.
Wm. Powell Company, Cincinnati, Ohio.
Pratt & Cady Company, Hartford, Conn.
Reeves Pulley Company, Columbus, Ind.
Reliance Gauge Column Company, Cleveland, Ohio.
Reliance Machine & Tool Works, St. Louis, Mo.
Jas. L. Roberston & Sons, New York.
John Royle & Sons, Paterson, N. J.
Sawyer Tool Mfg. Company, Fitchburg, Mass.
Sherwood Mfg. Company, Buffalo, N. Y.
Sight Feed Oil Pump Company, Milwaukee, Wis.
Skinner Engine Company, Erie, Pa.
J. E. Snyder, Worcester, Mass.
A. Sorge, Jr., & Co., Chicago, Ill.
Standard Railway Equipment Company, St. Louis, Mo.
Steel Mill Packing Company, Detroit, Mich.
Stempel Fire Extinguisher Company, St. Louis, Mo.
Roe Stephens Mfg. Company, Detroit, Mich.
Fred J. Swaine Company, St. Louis, Mo.
C. W. Thomas, Detroit, Mich.
Thomson Meter Company, Brooklyn, N. Y.
Union Steam Pump Company, Battle Creek, Mich.
Voorhees Mfg. Company, Jersey City, N. J.
Warren Steam Pump Company, Warren, Mass.
Washburn Shops of the Worcester Polytechnic Institute, Worcester, Mass.
Wheeler Condenser & Engine Company, New York.
L. & I. J. White Company, Buffalo, N. Y.
Wilmarth & Morman Company, Grand Rapids, Mich.
Windsor Machine Company, Windsor, Vt.
R. D. Wood & Co., Philadelphia, Pa.
Woodward & Powell Planer Company, Worcester, Mass.

BRAZIL, SILVER MEDALS.

Becker & Irmae.

BELGIUM, SILVER MEDALS.

Leon Loubet, Verviers.

FRANCE, SILVER MEDALS.

Constant Duval, Loubroil (Nord).
H. D. Grange, Paris.
Paul Guillemant, Paris.
Leon Lachery, Livry-sur-Oise.
Emanuel Farcot, St. Denis.
E. Ferrot, Bellegarde.
Alfred Nancon, Albert (Somme).
Les Fils Henri Picard, Paris.

GERMANY, SILVER MEDALS.

Alfred Gutmann, Hamburg.
Minimax-Apparate Bangesellschaft, Berlin.
H. Hommel, Mainz-Herstein.
H. Schluetter, Neustadt b. Huenenberg.
Friedrich Schmaltz, Affenbach a. M.
G. A. Schultze, Berlin.

GREAT BRITAIN, SILVER MEDALS.

John Moncreith, Perth, Scotland.
Joseph Baker & Sons, Limited, London.
Price's Patent Candle Company, Battersea, London.
Peter Wright & Sons, Dudley, England.

JAPAN, SILVER MEDALS.

Nitta Chapin, Osaka.

MEXICO, SILVER MEDALS.

Julio Callignon, Guadalajara.

THE NETHERLANDS, SILVER MEDALS.

Naamloose Bennootschap Eerste Nederlandsche Kroonleder fabrik v h. Gebr. Neoff, Lochea.

UNITED STATES, BRONZE MEDALS.

Abernathy Vise & Tool Company, Chicago, Ill.
John Action, Brooklyn, N. Y.
W. T. Adams Machine Company, Corinth, Miss.
Adjustable Clasp Company, Chicago, Ill.
American Floor Surfacing Machine Company, San Francisco, Cal.
Barrett's Boring Machine Company, Meadville, Pa.
Belmer Machine Tool Company, Cincinnati, Ohio.
Bickford Drill & Tool Company, Cincinnati, Ohio.
Bridgeport Safety Emery Wheel Mfg. Company, Incorporated, Bridgeport, Conn.
Bristol Company, Waterbury, Conn.
Brown-Cochran Company, Lorain, Ohio.
Buffalo Steam Pump Company, Buffalo, N. Y.
Burr Mfg. Company, Cleveland, Ohio.
Burt Mfg. Company, Akron, Ohio.
Chapman Double Ball Bearing Company, Fitchburg, Mass.
Cincinnati Planer Company, Cincinnati, Ohio.
Jas. Clark, Jr., & Co., Louisville, Ky.
Columbia Novelty Mfg. Company, St. Louis, Mo.
Cookson, T. J., Cincinnati, Ohio.
Curtis & Co. Mfg. Company, St. Louis, Mo.

De Loach Mill Mfg. Company, Atlanta, Ga.
Deming Company, Salem, Ohio.
Dreis & Krump, Chicago, Ill.
C. A. Dunham Company, Marshalltown, Iowa.
Durable Wire Rope Company, Boston, Mass.
Walter L. Flower & Co., St. Louis, Mo.
Fuller Company, Detroit, Mich.
Gardner Governor Company, Quincy, Ill.
Geiser Mfg. Company, Waynesboro, Pa.
Hench & Dromgold Company, St. Louis, Mo.
Higley Machine Company, New York.
Geo. W. Hoffman, Indianapolis, Ind.
H. J. M. Howard, Washington, D. C.
Howe Engine Company, Indianapolis, Ind.
E. B. Kunkel Company, Fort Wayne, Ind.
Landis Machine Company, Waynesboro, Pa.
R. K. Le Blond Machine Tool Company, Cincinnati, Ohio.
Wm. H. Leland & Co., Worcester, Mass.
Macgowan & Finigan Foundry & Machine Company, St. Louis, Mo.
McCarthy Portable Elevator Company, San Francisco, Cal.
Monarch Fire Appliance Company, New York.
Franklin Moore Company, Winsted, Conn.
National Steam Pump Company, Upper Sandusky, Ohio.
Neal & Brinker Company, New York.
Newton Machine Tool Company, Philadelphia, Pa.
Nonpareil Cock Company, New York.
Ohio Motor Company, Sandusky, Ohio.
Olds Gasoline Engine Works, Lansing, Mich.
Pilley Packing & Flue Brush Mfg. Company, St. Louis, Mo.
Pittsburgh Gauge & Supply Company, Pittsburgh, Pa.
Power & Speed Regulator Mfg. Company, Kalamazoo, Mich.
Pure Water Engineering & Construction Company, Pittsburgh, Pa.
Root & Van Dervoort Engineering Company, East Moline, Ill.
South Bend Pulley Company, South Bend, Ind.
Springfield Machine Company, Springfield, Ohio.
Sawyer Tool Mfg. Company, Fitchburg, Mass.
Standard Gauge Company, Syracuse, N. Y.
Steam Appliance Company, Milwaukee, Wis.
Sterling Emery Wheel Mfg. Company, Tiffin, Ohio.
Thorpe, Platt & Co., New York.
Vaughn Machine Company, Peabody, Mass.
Wilmarth & Morman Company, Grand Rapids, Mich.
Wyman & Gordon, Worcester, Mass.
Foster Pump Works, Brooklyn, N. Y.
Erie Foundry Company, Erie, Pa.
J. A. Fay & Egan Company, Cincinnati, Ohio.
Fosdick Machine Tool Company, Cincinnati, Ohio.

BELGIUM, BRONZE MEDALS.

Briquet de Raet, Brussels.
Ste. Au. Fabrigen, Hasesale et Apparatus, Niny.

GERMANY, BRONZE MEDALS.

Max Eberhardt, Muenchen.
Conrad Gautsch, Berlin.
Polte, Armature & Patron Factory, Sudenburg, Magdeburg.

MEXICO, BRONZE MEDALS.

Compania Industrial Mexicana, Chihuahua.

JAPAN, BRONZE MEDALS.

Buhei Ashimore, Osaka.

NICARAGUA, BRONZE MEDALS.

Carmen Caldera, Mesava.

Mines and Metallurgy Building.

The list of awards of grand prizes and gold medals to exhibitors in this building published in the issue of October 20 was quite incomplete. To the names then given the following should be added as indicated under the proper headings, the silver and bronze medal awards being wholly new matter:

UNITED STATES, GRAND PRIZES, GROUP 115.

St. Louis Well Machine & Tool Company, St. Louis, Mo., well drilling machines and appliances.
Keystone Driller Company, Beaver Falls, Pa., well drilling machinery and appliances.
American Diamond Rock Drill Company, New York City, diamond drilling machinery.
Broderick & Bascom, St. Louis, Mo., wire rope and underground mine haulage.

UNITED STATES, GOLD MEDALS, GROUP 115.

Star Drilling Machine Company, Akron, Ohio, well drilling machinery.
Blake & Knowles Steam Pump Works, New York City, electric mine pumps.
Morgan Electric Machine Company, East Chicago, Ind., third rail electric mine locomotive and system.
Howells Mining Drill Company, Plymouth, Pa., coal mining augers.
Atlas Car & Mfg. Company, Cleveland, Ohio, mine cars.
American Concentrator Company, Joplin, Mo., magnetic separator.
G. H. Elmore, Joplin, Mo., model zinc and lead concentrator.
J. E. Page, Kansas City, Mo., model of ore trains.
Chas. Engelhard, New York City, Heraeus-Le-Chatelier pyrometer.
Cleveland Stone Company, Cleveland, Ohio, grindstones.

UNITED STATES, SILVER MEDALS, GROUP 115.

American Well Works, Aurora, Ill., prospecting and well sinking machinery.
Downie Pump Company, Downieville, Pa., deep well pump.
Nicholls Mfg. Company, Ottumwa, Iowa, pneumatic hand rock drill.
Fairbanks, Morse & Co., Chicago, exhibit of mining machinery.
Brown Hoisting Machinery Company, Cleveland, Ohio, iron ore grab bucket.
Crawford & McCrimmon Company, Brazil, Ind., ventilating fan, hoisting engine, mine pump.
Archer Iron Works, Chicago, barrows and trucks.
Warren Wood, Paterson, N. J., rock drill.
Hockensmith Wheel & Mine Car Company, Penn Station, Pa., car wheels and mine cars.
Schoellborn-Albrecht Machine Company, St. Louis, Mo., crushing and pulverizing machinery.
Ohio Brass Company, St. Louis, Mo., electric railway brass bonds.
Moses P. Johnson Machine Company, St. Louis, Mo., mine hoisting machines.
A. H. Funke, New York City, acetylene mine lamps.
Wantling's Favorite Coal Drill Company, Peoria, Ill., auger coal drill.
Frederick E. Baldwin, New York City, cast iron mine lamps.
C. W. Crawford, Brazil, Ind., ventilating fans for mines.
Union Steam Pump Company, Battle Creek, Mich., mining pumps.

UNITED STATES, BRONZE MEDALS, GROUP 115.

Robinson Machine Company, Chicago, Ill., mine fan.
Star Mfg. Company, What Cheer, Iowa, mining tools.
Thomas Long, Phillipsburg, Mont., powder thawer.

UNITED STATES, GRAND PRIZES, GROUP 116.

International Acheson Graphite Company, Niagara Falls, N. Y., artificial graphite.

UNITED STATES, GOLD MEDALS, GROUP 116.

American Clay Working Machine Company, Bucyrus, Ohio, model brick making machinery.
Virginia Coal & Iron Company, Big Stone Gap, Va., coal and coke.
Tennessee Coal, Iron & Railroad Company, Birmingham, Ala., collective exhibit.
Louisville Firebrick Company, Louisville, Ky., fire brick.
Cement Machinery Company, Jackson, Mich., artificial stone.
Safety Emery Wheel Company, Springfield, Ohio, emery wheels.
Missouri Fire Brick Company, St. Louis, Mo., gas retorts and fire brick.
Wyoming Railway & Iron Company, Guernsey, Wyo., iron ores, steel products.

UNITED STATES, SILVER MEDALS, GROUP 116.

Andrews & Hitchcock Iron Company, Youngstown, Ohio, iron ore, slag and other products.
Hecla Iron Company, Hecla Furnace, Ohio, iron ore and products.
Ashland Iron & Mining Company, Ashland, Ohio, bituminous coal.
Old Dominion Iron & Nail Works Company, Richmond, Va., tested iron.
Ransom Mfg. Company, Oshkosh, Wis., motor driven emery grinder.
National Tripoli Company, Kirkwood, Mo., tripoli.
McKelvey Concrete Machinery Company, Chicago, concrete mixer.
Star Corundum Wheel Company, Detroit, Mich., emery wheels.
Scot Mfg. Company, Keokuk, Iowa, model of brick machine.
Ross-Keller Tripoli Pressure Brick Machine Company, St. Louis, Mo., iron, steel and bronze.

UNITED STATES, GRAND PRIZES, GROUP 118.

Whiting Foundry Equipment Company, Harvey, Ill., cranes, cupolas and other foundry equipment.
S. Obermayer Company, Cincinnati, Ohio, foundry equipment.

Pittsburgh Chamber of Commerce, Pittsburgh, Pa., steel rails.

Baker & Co., Incorporated, Newark, N. J., platinum.

UNITED STATES, GOLD MEDALS, GROUP 118.

Western Gas Construction Company, Ft. Wayne, Ind., gas generator.

Williams Patent Crusher & Pulverizer Company, St. Louis, Mo., crusher.

Adams Company, Dubuque, Iowa, molding machine, tumbling machine, emery grinder.

Sloss-Sheffield Steel & Iron Company, Birmingham, Ala., pig iron and raw materials.

Tennessee Coal, Iron & Railroad Company, Birmingham, Ala., basic open hearth steel.

Republic Iron & Steel Company, Birmingham, Ala., pig iron and raw materials.

Wilson Aluminum Company, Holcomb, Va., ferrochrome and other iron alloys.

P. H. & F. M. Roots Company, Connersville, Ind., foundry blower.

Allyne Brass Foundry Company, Cleveland, Ohio, aluminum casting.

Curtis & Co. Mfg. Company, St. Louis, Mo., compressor, pneumatic electric hoist.

John Porteous Mfg. Company, Cincinnati, Ohio, portable brass foundry.

Tabor Mfg. Company, Philadelphia, Pa., molding machines and other equipment.

Watertown Arsenal, Watertown, Mass., steel projectiles.

Charles Engelhard, New York, electric furnaces.

F. L. Bartlett, Denver, Col., concentrator table.

UNITED STATES, SILVER MEDALS, GROUP 118.

F. W. Braun, Los Angeles, Cal., portable forge and tempering furnace.

New Jersey Zinc Company, Franklin Furnace, N. J., zinc ores and products.

Enterprise Enamel Company, Bellaire, Ohio, enameled iron.

Pickands, Mather & Co., Cleveland, Ohio, pig iron products.

St. Joe Lead Company, Bonne Terre, Mo., pig lead.

Desloge Lead Company, Desloge, Mo., pig lead.

Valle Mining Company, Valle Mines, Mo., pig lead.

Sligo Furnace Company, Sligo, Mo., pig iron.

St. Louis Car Company, St. Louis, Mo., brass and brass castings.

Arthur E. Barlow, Newark, N. J., models of melting and annealing furnaces.

Ewald Iron Company, St. Louis, Mo., iron and steel.

Chrome Steel Works, Chrome, N. J., chrome steel plates, &c.

Millett Core Oven Company, Brightwood, Mass., core oven in operation.

Stupp Bros. Bridge & Iron Company, St. Louis, Mo., structural steel work.

Banner Iron Works, St. Louis, Mo., structural iron work.

Forter-Miller Engineering Company, Pittsburgh, Pa., gas producer.

Rush National Oil Burner Company, St. Louis, Mo., brass and bronze castings.

St. Louis Malleable Iron Castings Company, St. Louis, Mo., malleable iron castings.

Rowan Expansion Pulley Company, Denver, Col., expanding pulleys.

Frost Mfg. Company, Galesburg, Ill., fire tube boiler throttling steam engine.

Theo. F. White, Colton, Col., oil spraying machine.

Midvale Mining & Mfg. Company, St. Louis, Mo., ground ferromanganese, ferrosilicon and aluminum.

Brown Specialty Machine Company, Chicago, hammer core machine.

Falls Rivet & Machine Company, Cuyahoga Falls, Ohio, core machine.

J. S. McCormick, Pittsburgh, Pa., cupola.

Hill & Griffith Company, Cincinnati, Ohio, portable core oven and foundry supplies.

Dodge Mfg. Company, Mishawaka, Ind., pulley and hanger castings.

Merritt & Co., Philadelphia, Pa., expanded metal lockers.

Hanna Engineering Works, Chicago, pneumatic sand shakers.

Yale & Towne Mfg. Company, Stamford, Conn., electric foundry hoist.

W. J. Keep, Detroit, Mich., iron testing machine.

UNITED STATES, BRONZE MEDALS, GROUP 118.

Foster & Shepherd, Nashville, Tenn., sad irons.

Roane Iron Company, Rockwood, Tenn., pig iron.

Rockdale Furnace Company, Clifton, Tenn., high phosphorus iron.

Cranberry Iron Company, Johnson City, Tenn., pig iron.

La Follette Iron Company, La Follette, Tenn., pig iron.

Harriman Plow & Handle Company, Harriman, Tenn., plow castings.

Tower Grove Foundry Company, St. Louis, Mo., moldings.

John Kiburz Pattern Company, St. Louis, Mo., foundry patterns.

Philadelphia Pneumatic Tool Company, Philadelphia, Pa., Keller rammer.

Brown Hoisting Machinery Company, Cleveland, Ohio, triplex chain hoist.

Smooth-On Mfg. Company, Jersey City, N. J., iron cement.

J. D. Smith Foundry Supply Company, Cleveland, Ohio, core box lumber.

Roessler & Hasslacher Chemical Company, New York, electrolytic ferrosilicon.

Dan Galvin, Paducah, Ky., brass castings.

Decatur Car Wheel Mfg. Company, Birmingham, Ala., car wheels.

UNITED STATES, GRAND PRIZES, GROUP 119.

David Williams Company, New York, *The Iron Age* and other publications.

United States Geological Survey, Washington, D. C., publications.

American Institute of Mining Engineers, New York, publications.

The *Engineering and Mining Journal* (including the *Mineral Industry*), New York, publications.

Geo. Frederick Kunz, New York, publications, gems and precious stones.

David T. Day, Washington, D. C., publications, mineral statistics.

UNITED STATES, GOLD MEDALS, GROUP 119.

Brickbuilder, Boston, Mass., journal.

UNITED STATES, SILVER MEDALS, GROUP 119.

Mining Reporter, Denver, Col., publications.

Foundry, Cleveland, Ohio, publications.

Iron Trade Review, Cleveland, Ohio, publications.

Lead and Zinc News, St. Louis, journal.

Mining World, Chicago, journal.

UNITED STATES, BRONZE MEDALS, GROUP 119.

Mining Review and Metallurgist, Chicago, publication.

Metal Industry, New York City, publication.

Mining and Engineering Review, San Francisco, Cal., publication.

BELGIUM, SILVER MEDALS, GROUP 118.

Société Anonyme des Laminoirs du Ruan, Monceau-sur-Sambre, iron and steel.

CANADA, SILVER MEDALS, GROUP 116.

Nova Scotia Steel & Coal Company, Sydney Mines, N. S., coal.

John McDougall & Co., Montreal, Quebec, bog iron ore and products.

Londonderry Iron & Mining Company, Londonderry, N. S., iron ore and products.

CANADA, SILVER MEDALS, GROUP 118.

Electric Reduction Company, Limited, Buckingham, Quebec, ferrochromium, ferrosilicon and phosphide of iron.

CANADA, GOLD MEDALS, GROUP 119.

Canadian Mining Review, Montreal, Canada, publications.

FRANCE, GOLD MEDALS, GROUP 118.

Paul Regnard, Paris, metal plates punched and sawed.

FRANCE, SILVER MEDALS, GROUP 118.

Nancon, A. Albert (Somme), France, special steel tools.

Edmund Fouche, Paris, collection of blow pipes.

FRANCE, GOLD MEDALS, GROUP 119.

Charles Beranger, Paris, books on engineering, architecture and industry.

Veuve Charles Dunod, Paris, books on exploitation of mines and metallurgy.

GERMANY, GRAND PRIZES, GROUP 115.

Frieman & Wolf, Zwickan, safety lamps and tools.

Koenigliche Porzellan Manufacture, Berlin porcelain ware for laboratories.

GERMANY, GOLD MEDALS, GROUP 115.

Siemens-Halske, Berlin, electric mine signaling apparatus.

GERMANY, GOLD MEDALS, GROUP 118.

Aug. Gundlach, graphite crucibles.

GREAT BRITAIN, GOLD MEDALS, GROUP 115.

John Davis & Sons, All Saints' Works, Derby, England, mining and surveying instruments and safety lamps.

Robinson Hainsworth, 11 Victoria street, Hull, England, mine cage safety catch.

GREAT BRITAIN, GOLD MEDALS, GROUP 116.

P. Macfayden & Co., Winchester House, Old Broad street, London, E. E., England, manganese ores.

Johnson & Sons, Limited, Castleton Foundry, Armley, Leeds, England, coal briquetting plant.

GREAT BRITAIN, SILVER MEDALS, GROUP 116.

Edgar Allen & Co., Limited, Imperial Steel Works, Tinsley, Sheffield, England, specimens, steels and steel alloys.

GREAT BRITAIN, GRAND PRIZES, GROUP 118.

Monkbridge Iron & Steel Company, Limited, Leeds, Yorkshire, England, pig iron, refined iron and products.

Farnley Iron Company, Limited, Leeds, England, coal, iron ore, iron and steel products.

GREAT BRITAIN, GOLD MEDALS, GROUP 118.

Sheepbridge Coal & Iron Company, Limited, Chesterfield, England, wrought iron and cast iron pipes.

Anglo-French Nickel Company, Limited, Hafod Isha Works, Swansea, South Wales, nickel and cobalt ores, mattes and speiss.

GREAT BRITAIN, GRAND PRIZES, GROUP 119.

Engineering, London, publications.

GREAT BRITAIN, SILVER MEDALS, GROUP 119.

Mining Journal, London, publications.

JAPAN, SILVER MEDALS, GROUP 116.

Amenomiya Wataan, Iwatoken, pig iron.

Niegata Iron Works, Niigataken, boring tools and oil furnace.

JAPAN, GRAND PRIZES, GROUP 118.

Imperial Steel Works, Fukuoka-ken, steel.

JAPAN, GOLD MEDALS, GROUP 119.

Mining Institution of Japan, Tokyo, publications.

Tsunashiro Woda, Tokyo, minerals of Japan.

Manufactures and Varied Industries Buildings.

Exhibits in the Manufactures and Varied Industries buildings both come under the general heading of manufactures and are arranged in groups regardless of which building the exhibit was located in. Thus far exhibits in these two buildings have not received official notification of final awards, as there were so many contests that the Superior Jury of Awards has not completed its labors of settling the matter. The following awards, therefore, are those that were originally promulgated by the Department Committee, and are subject to revision by the Superior Jury. The list is incomplete, as many firms have asked us to withhold their names until after the final award by the Superior Jury:

CUTLERY, GROUP 29.

Simmons Hardware Company, St. Louis, Mo., cutlery, grand prize.

National Cutlery Company, Philadelphia, Pa., scissors, shears and snips, grand prize.

Gillette Sales Company, Chicago, Ill., razors, gold medal.

Landers, Frary & Clark, New Britain, Conn., cutlery, grand prize.

Gillette Sales Company, Chicago, Ill., safety razors, gold medal, for excellence of razor rather than for skill in display.

HARDWARE, GROUP 41.

Broderick & Bascom Rope Company, St. Louis, grand prize for wire ropes.

Boston & Lockport Block Company, Broderick & Bascom Rope Company, St. Louis, agents and exhibitors, gold medal; stated to be highest award for pulley blocks.

Goshen Mfg. Company, Goshen, Ind., silver and bronze medals for Boyer's gliding settee, lawn swings, ladders and hay slings.

International Steel Post Company, St. Louis, gold medal for steel fence posts, iron and wire fences, fence machines, &c.

Louden Machinery Company, Fairfield, Iowa, grand prize on hay tools, barn door hangers, feed and litter carriers and other barn, warehouse and stable fixtures.

Mesker & Bros., St. Louis, Mo., award made but not officially announced.

Missouri Lamp & Mfg. Company, St. Louis, gold medal for chemical fire extinguishers.

National Enameling & Stamping Company, St. Louis, unofficial, grand prize on Royal granite ware, gold medal on Venetian and colored enameled ware, gold medal on best assortment of tin, galvanized and japanned household utensils.

Newman Mfg. Company, Cincinnati, Ohio, silver medal for mechanical advertising display fixtures.

Perfection Fixture Company, Flint, Mich., silver and bronze medals for display fixtures.

Peters Cartridge Company, Cincinnati, Ohio, gold medal, subject to decision of jury.

Pilley Packing & Flue Brush Mfg. Company, St. Louis, bronze medal on flue brushes and packing; bronze medal on wire brushes and brooms.

Sherer Bros. Company, Chicago, grand prize on store fixtures.

Smith & Davis Mfg. Company, St. Louis, grand prize on metal beds and wire mattresses; gold medal on springs.

Art Metal Construction Company, Jamestown, N. Y., metal office furniture, grand prize and two gold medals.

American Can Company, New York, tin cans and boxes, grand prize and gold medal.

Ames Shovel & Tool Company, Boston, Mass., shovels, spades, scoops, &c., gold medal.

Bashlin Company, Warren, Pa., valves and faucets, three gold medals.

J. Baum Safe & Lock Company, Cincinnati, Ohio, fire and burglar proof safes, gold medal.

Bonner Brothers, Brooklyn, N. Y., spring hinges, gold medal.

Boston & Lockport Block Company, Boston, Mass., blocks and tackle, gold medal.

Capewell Horse Nail Company, Hartford, Conn., horse nails, gold medal.

Carborundum Company, Niagara Falls, N. Y., three grand prizes, five gold medals, one silver medal.

Thomas Devlin Mfg. Company, Philadelphia, Pa., iron, brass and steel castings, gold medal.

Stewart Hartshorn Company, East Newark, N. J., shade rollers and special devices, three gold medals.

Hutchins Roller Swing Company, Alton, Ill., lawn and porch swings, silver medal.

Lloyd Mfg. Company, Minneapolis, Minn., wire measuring machine, grand prize.

David Lupton's Sons Company, Philadelphia, Pa., metal windows, silver medal.

Monumental Bronze Company, Bridgeport, Conn., monuments and statuary, gold and silver medals.

National Safe & Lock Company, Cleveland, Ohio, burglar and fire proof safes, grand prize and gold medal.

National Specialty Mfg. Company, Philadelphia, Pa., hardware specialties, silver medal.

Philadelphia Hardware & Malleable Iron Works, Philadelphia, Pa., marine and awning hardware, silver medal.

Remington Arms Company, Ilion, N. Y., sporting and military firearms, gold medal.

Simmons Hardware Company, St. Louis, Mo., edge tools, two grand prizes and gold medal.

Spring Steel Fence & Wire Company, Anderson, Ind., woven wire fence, silver medal.

Stewart Iron Works Company, Cincinnati, Ohio, iron fencing, gates and lawn furniture, gold medal.

Victor Safe & Lock Company, Cincinnati, Ohio, safes, vaults and deposit work, grand prize.

J. D. Warren Mfg. Company, Chicago, hardware shelving, two gold medals.

Whitely Exerciser Company, Chicago, gold medal.

J. H. Williams & Co., Brooklyn, N. Y., Vulcan chain pipe wrenches, gold medal; drop forged wrenches, gold medal; general drop forgings, gold medal.

APPARATUS AND PROCESSES FOR HEATING AND VENTILATING, GROUP 48.

Enterprise Mfg. Company, Philadelphia, Pa., gold medal.

Kinney Cabinet Cooker Company, Chicago, silver medal.

Hart & Cooley Company, New Britain, Conn., gold medal.

National Enameling & Stamping Company, St. Louis, Mo., gold medal.

Malleable Steel Range Company, steel ranges, South Bend, Ind., gold medal.

National Lighting & Heating Company, Royersford, Pa., stove, gold medal.

National Vapor Stove Company, Lorain, Ohio, gold medal.

Ruud Mfg. Company, Pittsburgh, Pa., gas water heaters, gold medal.

St. Louis Enameling Company, St. Louis, Mo., stoves and ranges, gold medal.

Toledo Cooker Company, Toledo, Ohio, silver medal.

Jacob J. Vollrath Company, Sheboygan, Wis., gold medal.

Wagner Mfg. Company, aluminum cooking utensils, gold medal.

Wrought Iron Furnace Company, ranges and furnaces, St. Louis, Mo., grand prize.

Aluminum Cooking Utensil Company, Pittsburgh, Pa., steam cookers, gold medal.

Andrews Heating Company, Minneapolis, Minn., hot water heating apparatus, silver medal.

Channon Emery Stove Company, Quincy, Ill., stoves, gold medal.

Comstock-Castle Stove Company, Quincy, Ill., stoves and ranges, gold medal.

Excelsior Stove & Mfg. Company, Quincy, Iill., stoves, gold medal.

General Gas Light Company, Kalamazoo, Mich., incandescent lamps, gold medal.

Lisk Mfg. Company, Canandaigua, N. Y., enameled metal ware and nickel plated ware, gold medal.

Peerless Steam Cooker Company, Buffalo, N. Y., coffee pots and steam cookers, bronze and silver medals.

Sheridan Stove Mfg. Company, Quincy, Ill., stoves, gold medal.

Tuttle & Bailey Mfg. Company, New York City, hot air registers, grand prize and two gold medals.

American Radiator Company, Chicago, grand prize and gold medal on ideal boilers and heating systems as illustrated by Colonial Model House.

Eclipse Gas Stove Company, Rockford, Ill., gold medal for gas working stoves and ranges.

Majestic Mfg. Company, St. Louis, grand prize on Majestic steel and malleable iron ranges, water heaters, &c.

Thomas White Stove Company, Quincy, Ill., gold medal

Geo. M. Clark & Co., Division of American Stove Company, grand prize on Jewel gas ranges and gasoline stoves.

Dangler Stove Company, Division of American Stove Company, grand prize on Dangler gas and gasoline and oil stoves.

Quick Meal Stove Company, Division of American Stove Company, St. Louis, grand prize on Quick Meal gas and gasoline oil stoves.

National Stove Company, Division of American Stove Company, Lorain, Ohio, grand prize on Insurance gasoline stoves.

Quincy Stove & Mfg. Company, Quincy, Ill., gold medal.

Gem City Stove Company, Quincy, Ill., gold medal.

Ohio Cooker Company, Toledo, Ohio, silver medal, claimed to be the highest award for steam cookers.

PLUMBING AND SANITARY MATERIALS, GROUP 46.

Day Metallic Mfg. Company, Detroit, Mich., gold medal.

H. Mueller Mfg. Company, Decatur, Ill., three grand prizes and one gold medal.

N. O. Nelson Mfg. Company, St. Louis, Mo., gold medal.

Standard Sanitary Mfg. Company, Pittsburgh, Pa., grand prize.

Trenton Potteries Company, Trenton, N. J., one grand prize, one gold medal.

Tremont Mfg. Company, Roxbury, Mass., silver medal.

TRANSPORTATION BUILDING, GROUP 72.

Broderick & Bascom Rope Company, St. Louis, Mo., silver medal; stated to be the highest award for wagons for hauling heavy cable.

Joliet's Inducements to Manufacturers.

The Citizens' Alliance of Joliet, Ill., has issued a very handsome 24-page pamphlet, containing a large number of artistic half-tones, which is devoted to the presentation of facts concerning the industrial advantages of that city. The book treats of the railroad lines which serve the city, enumerates the great variety of industries now located there, specifies the character of building material in the immediate vicinity, sets forth the proximity of coal mines, predicts the early development of 65,000 horse-power from the flow of water furnished by the ship canal from Chicago, dwells on the city's banking facilities and extols its social and educational advantages. Great stress is laid on the point that industrial peace is assured in the city. Not the least interesting feature of this publication is a map which shows the location of Joliet and plots the various railroads which serve the city. A belt line, the Elgin, Joliet & Eastern, crosses every road entering Chicago, which gives to Joliet the same freight rates and facilties enjoyed by Chicago without Chicago's congested conditions.

Since the formation last March of the Ramapo Foundry & Wheel Works, Ramapo, N. Y., business has increased so rapidly that the capacity of the plant is not sufficient to meet the demands, and the company is building an addition, 63 x 70 feet, which will give it a daily capacity of from 250 to 300 wheels. Further enlargement of the works is under consideration.

To Boom East St. Louis.

Business men of East St. Louis, Ill., have formed a nonpolitical organizations, known as the "100,000 Club," whose purpose will be to advance the interests of the city. Particular attention will be paid to attracting industries to East St. Louis, and to this end steps will be taken to acquaint the industrial world with the exceptional facilities which that city offers in the matter of transportation by water and rail, cheap fuel due to the proximity of large coal mining operations and to the fact that workmen can build, buy or rent homes at low prices. The club will also concern itself with municipal improvements and will exert its efforts to secure the removal of unsightly buildings and the erection of modern commercial and industrial structures. Thos. L. Fekete, a former postmaster, and the prime mover in the enterprise, has been appointed temporary chairman, and he will appoint a committee of fifteen leading citizens, who will assist him in perfecting a permanent organization.

The American Sheet & Tin Plate Company, Frick Building, Pittsburgh, has issued a calendar for 1905, which is entitled the "M. F. Calendar." It is quite a unique device, the leaves being arranged in the form of a book attached to a representation of a sheet of tin plate, with the company's "M. F." trade-mark forming a number of clips, so that each leaf as it is turned over can be held in place by the trade-mark clips. The company requests those who desire copies of this calendar to write their names, lines of business and addresses upon postal cards and mail them to the advertising department of the company. Postal cards are strongly preferred, as they facilitate the handling of the requests received.

Judge Bradford, in the United States District Court at Wilmington, Del., has dismissed the involuntary petition of bankruptcy in the case of the Diamond State Steel Company, and later James P. Winchester, president of the First National Bank of Wilmington, and Howard T. Wallace, the president of the Diamond State Steel Company, were appointed receivers.

Commercial failures in this country for the last 12 months were greater in number than in any similar period since 1897. Twelve thousand five hundred and eighty firms were forced to the wall in that time, with liabilities amounting to $149,698,846. In 1903 the number was 11,406 firms with $147,906,760 liabilities. In 1897 13,351 firms failed, their liabilities amounting to $154,332,071.

The Pittsburgh, Bessemer & Lake Erie Railroad is believed to be about to secure an entrance to New Castle, Pa., and in doing so will tap a region rich in limestone and coal. The Buffalo, Rochester & Pittsburgh is now doing the last work on its Big Run extension, which reaches two important manufacturing plants in the eastern part of New Castle. The outlook is excellent for a brisk winter at all the Shenango Valley mills.

Washington advices state that the Merchant Marine Commission is expected to report to Congress during the present week, submitting a draft of the bill agreed upon. The bill has been drawn up, but may be changed in some particulars before it is reported. As it now stands it proposes to double the tonnage tax on all vessels sailing from United States ports in the foreign trade and to provide for paying subsidies to American vessels equal in amount to the tonnage tax collected.

Commerce between the United States and China in the ten months ending with October, 1904, shows a larger total, both in imports and exports, than in the corresponding months of any previous year. This is especially interesting in view of the fact that trade with China, particularly as relates to exports to that country, had been materially reduced for a time, due presumably to unsettled conditions in that part of the world.

The Mechanical Engineers' Convention.

The opening in New York City of the fiftieth meeting of the American Society of Mechanical Engineers, on Tuesday evening, December 6, was reported in the last issue of *The Iron Age*, but of the papers presented Wednesday morning and evening only the titles and authors were mentioned, as no discussions were then available. The following covers the proceedings from the second session, Wednesday morning, to the closing session, Friday morning.

SECOND SESSION.

The second session was held Wednesday morning in Mendelssohn Hall, West Fortieth street, and was the official business session of the meeting. Among the announcements the secretary, Prof. F. R. Hutton, stated that the last year has been the record for the number of accessions to membership in all grades taken in in one year, the total number being 262, of which 121 were members, 48 associates and 93 juniors. The report of the election of officers for the ensuing year was as follows: For president, John R. Freeman, Providence; vice-presidents, S. M. Vauclain, Philadelphia; H. H. Westinghouse, Pittsburgh, and Fred. W. Taylor, Philadelphia; managers, Geo. M. Brill, Chicago; Fred. J. Miller, New York City; Richard H. Rice, Lynn; treasurer, Wm. H. Wiley, New York City. Concerning the Union Engineering Building, Chas. W. Hunt reported that the site had been cleared and the plans were substantially completed, and the contracts would probably be let in a short time. The fund for a memorial to Robert H. Thurston, the first president of the society, was reported upon by Gus C. Henning, who stated that $780 had already been subscribed. The memorial will take the form of a bronze bust, life size or a little larger. H. H. Supplee, chairman of the committee for collecting material for a history of the society during its 25 years of existence, made a very interesting report concerning the work done by that committee. Mr. Supplee also reported upon the work of the Joint Library Committee of the three engineering societies which will occupy the new Union Engineering Building, of which committee he is secretary. Its aim is to make this the greatest engineering and scientific library in existence.

The Coal Testing Plant at St. Louis.

An important matter was brought to the attention of the society by Col. E. D. Meier concerning the coal testing plant at the Mining Gulch at the Louisiana Purchase Exposition. Owing to the difficulties in securing appropriations from Congress and certain conditions imposed, the work was greatly delayed and it was not until toward the close of the Exposition that any really important tests were made. Now that the Fair is closed and the tests are only barely inaugurated, it is hoped that provision may be made for continuing the work. The Fair officials have consented to the retaining of the buildings for six months longer in order to continue the tests, and contributors of apparatus have agreed to let the plant remain. An appropriation of $100,000 is now being asked of Congress, and it is hoped that interest will be aroused to the extent of making the plant a permanent institution at a location to be selected later. The St. Louis Engineering Club has passed resolutions on the appreciation of the value of these tests and the hope that they may be empowered to continue, and it is urged that the members of this society as individuals write to their Congressmen to secure, if possible, their co-operation in obtaining the required appropriation.

The remainder of the session was given to the presentation of papers.

"A New Hydraulic Experiment."

The paper on this subject, by A. F. Nagle, Buffalo, N. Y., dealt with the determination of the rise of water in a stand pipe having a long supply pipe when the flow suddenly ceases. The condition is one which exists where a long supply pipe with a stand pipe is used to connect a reservoir with pumping engines. Various theories as to what would happen in a case of this sort have been entertained, but so far as was known by the writer no experiments had ever been made before to confirm or contradict them. The apparatus used in the experiment consisted of a barrel kept full to overflowing with water, the surface being 46 inches above the floor. From the bottom of this and 24 inches above the floor a ½-inch pipe, 48 feet long, was run inclining to within 10 inches of the floor, and to the end of this an elbow and vertical riser was attached. Five inches from the bottom of the riser a bib cock was inserted. Above the cock the riser was of glass. Having found the static level of the water in the glass, the cock was opened and regulated to a constant flow to a level 24 inches below the original level in the glass tube. The bib cock was then closed suddenly and the rise of water in the glass above the original level was noted. Similar experiments were made with various levels during the running of the water and from the results tables were calculated and curves plotted, all the formulæ for the calculations being given. Other experiments were made with larger sizes of pipe, the results of the calculations being tabulated and plotted. In no case did the actual rise in the stand pipe reach the theoretical hight. The commercial application of the principles involved in these experiments is in the hydraulic ram, and, as mentioned by one of the members in discussion, the ram is a means of elevating water the efficiency of which is not well appreciated.

In the discussion a communication from Prof. R. C. Carpenter of Cornell University was read, which called attention to the fact that an experiment essentially of the same nature was described by him in a paper on "Experiments on the Effect of Water Hammer." It explained that the resulting pressure produced by the sudden closing of the valve depended upon the velocity of the water flowing, how suddenly stopped and whether or not an air chamber was supplied. Without an air chamber the pressure in some cases exceeded ten times the initial static pressure. He also called attention to the investigations by Prof. M. Joukovsky of Moscow, the results of which will be published by the Association of Engineering Societies, as compiled by O. Simin. The formulæ deduced from these experiments were given, and the experiment proved the calculated results practically accurate.

Geo. W. Colles, Milwaukee, Wis., also submitted a written discussion which called attention to the fact that the hight to which the water will be raised in a stand pipe by the sudden shutting off of flow is the maximum only when there is little or no head in the stand pipe while the water is flowing. He also criticised the author's equations and the manner in which the problem was attacked, and offered additional equations. He mentioned the insufficiency of the author's equations in calculations for cases occurring in practice on account of the wholly different conditions, citing as an example a long turbine penstock in which the water being suddenly checked when flowing at a considerable velocity would burst the penstock if not provided with relief valves, although the hight to which the water would rise in the stand pipe or enlarged chamber would be insignificant.

"A Twist Drill Dynamometer."

The second paper, entitled as above, was the joint work of Prof. Wm. W. Bird and Howard P. Fairfield of the Worcester Polytechnic Institute. It describes a machine for measuring the twist or moment and the thrust on a drill. The apparatus is mounted on the table of a milling machine and is provided with two indicators to take autographic records of the forces just noted. The first tests were on soft gray cast iron, using a Novo steel drill. It was found that the power required for a drill varies directly with the number of revolutions, while the thrust does not increase with the speed, but depends upon the feed per revolution, and also that less power is required to drill a given hole in a given time by increasing the feed per revolution than by increasing the revolutions. In other tests with respect to the proper angle

of grinding the drill it was found that the thrust would be decreased by having more of a point on the drill. With an angle of 37 degrees the drill cannot stand up on repeated work, while at 45 degrees it could do the work as well as at 59 degrees and with much less thrust. The moment with the various angles remained practically constant, indicating that the driving power does not change with the angles of the drill. Another interesting point was that the thrust on on a 5/8-inch drill was reduced about one-half by previously removing the center of the hole with a 1-10-inch drill. It was mentioned that the range of experiments is almost limitless to cover the entire field for feed, speed, angle of drill, &c., for various materials and all kinds and sizes of drills, and the hope expressed that other experiments may be added to supplement the information contained in this paper.

In the discussion. Harrington Emerson criticised the absence of information of a more practical nature for the benefit of those who do not have time to make such tests. Fred. W. Taylor mentioned tests made several years ago by Wm. Sellers & Co., to determine the best angles for drills to be used in various metals. Forty-five degrees was adopted at that time as the best standard angle for a twist drill. It was also determined that as the metal increases in hardness the point must be more blunt.

The concluding paper of the morning,

"Diamond Tools,"

by Gus C. Henning, New York, was on a subject which has not previously appeared in the transactions of the society, and should be of interest to engineers and manufacturers. Diamond tools are particularly applicable in the field where the hardest steel is not sufficient, such as the working of hard rubber, paper and hardened steel. Two classes of diamonds were described, the black diamond, an amorphous, granular stone of a dark purple brown, which is the hardest material known and has great strength. The other, bort, is entirely crystalline, generally transparent and of all colors, including white. That which is almost black is the hardest and the white the next harder. The use of the tools, their preparation, setting and shape were all described and several forms illustrated. Among its important uses in the mechanical field are the truing of grinding wheels and the drawing of very small wire, where the wear on the die must be eliminated to preserve permanence of accuracy in the size. This is particularly necessary for the drawing of wire for electrical instruments and platinum wires for incandescent lamps, where absolute roundness is necessary in order to secure the best vacuums within the lamp. Other uses are the drilling of stone with core drills set with diamonds. In an extreme case, solid cores 21 inches in diameter were cut. One method of setting the diamonds in steel tools is to first plate them, then cast molten metal around them which alloys with the deposited metal and gives an absolutely firm and rigid setting. Diamonds will withstand very high temperatures without having their hardness affected or being in any way injured. For dies, the most approved setting consists of casting steel around the diamond to prevent its bursting, and then casting bronze around the steel to prevent corrosion of the steel by substances used to lubricate the wire as it passes through the die. The hole through the diamond is made tapering on both sides. The smallest dies known had holes 0.001 inch in diameter, and even smaller holes have been called for, the accuracy being attained to within 0.0001 inch. The economy in the use of diamonds is due to their long wearing qualities, covering many years. In reply to inquiries, the author stated that the diamond was frequently worked red hot, and water was then run on it for cooling, but the stone was not loosened or in any way injured. He stated that the very small holes are bored in the diamond dies by a steel needle revolving at 13,000 revolutions per minute, the diamond being brought against the needle with about 300 impacts per minute.

At the close of the morning session the members adjourned to the society's rooms on West Thirty-first street, where they were served with luncheon.

THIRD SESSION.

Wednesday evening the next session was held in Mendelssohn Hall and was devoted exclusively to the consideration of papers. The first paper,

"Centrifugal Fans,"

by A. J. Bowie, Jr., San Francisco, described a rather scientific investigation of the phenomena connected with the flow of air in centrifugal fans. The author classifies the losses in centrifugal fans as those due to the sudden change in velocity of air, or direction of air, to air friction, to back slippage of air past the running rings, to eddy currents and to mechanical friction in the bearings. For measuring velocity and direction of flow, an apparatus resembling a Pitot tube was used, which consisted of two small brass tubes soldered together side by side, through which lateral openings were made at one end, while the other ends were connected by rubber tubing to a very sensitive manometer. According to theory, the openings were first placed directly opposite one another, to face, respectively, toward and away from the flow of air, but it was found that the results were not accurate, and by experiment a better arragement proved to be the placing of one opening at right angles to the other and normal to the flow of air. Curves were plotted for the pressure recorded when the instrument was turned to direct its openings through all angles on a plane parallel with the flow. The instrument was calibrated and was found to be so sensitive that the direction of flow could be determined within ½ degree. With this instrument the region across the face of the fan was explored and curves plotted for the radial velocity existing at all points with blades of several forms. The velocity curves were also plotted for the air entering the suction side of the fan. With the instrument it was possible to determine the velocity and direction of air when leaving the runner. In one case, with a single suction fan run beyond its capacity, all of the discharge was found to be given from the sides of the runner, while the air in the center of the face was actually on the point of starting in the other way.

A written discussion submitted by Professor Carpenter, who has made experiments on centrifugal fans for several years, stated that he thought that the paper did not add to our stock of knowledge on the subject and disagreed with the statement made that waste space is a thing to be avoided in fan design if it was meant to signify that large clearance space is not desirable between the fan wheel and casing, as he has found this to be of great importance. He considers that the form of the casing and the form of the discharge pipe are practically, as well as theoretically, matters of considerable moment. The apparatus described he considers a crudely constructed Pitot tube, and that the results obtained with it are not explained by anything in connection with the paper. He declared decidedly his belief in the accuracy of the Pitot tube, which the author seemed to disparage.

The second paper of the evening was one of considerable worth to those concerned with water power work. The subject was

"Some Details Entering Into the Computation of the Values of Water Powers and the Damages Caused by the Diversion of Water Used for Power,"

and the author, Chas. T. Main of Dean & Main, consulting engineers, Boston, Mass. In estimating the value of an undeveloped privilege, he recommends that the following steps be taken: Determine the flow, including the effect of storage and pondage; the net head; the horsepower which can be economically developed and used each month in an average year; the minimum flow and power, and from this the size of supplementary steam plant required if the power is to be developed above the minimum flow; the shortage of water power during such months as there is a deficiency; estimate the probable cost of the supplementary plant, using steam, gas, oil or anything which is best for the location under consideration; the yearly cost of running the water power and supplementary plants, including the fixed charges on both, to produce a combined power suitable for the purpose for which the power is to be used; the cost of a steam or other kind of plant necessary to produce the power required;

the yearly cost of running this plant, including fixed charges, to produce the power required; then subtract the cost of producing the power by water power and the supplementary plant from the cost of producing it by steam power, or some other method, alone. The difference, if positive, gives the apparent yearly saving by the use of water power. The apparent saving should be modified, if necessary, for location or any other thing affecting the value. Next capitalize this difference at a rate which seems proper, and the result is the value of the privilege. For certain reasons, which the author gives, the yearly savings should be capitalized at a rate not less than 10 per cent. If the privilege is developed, the total value includes the value of the plant, which will be its cost less depreciation up to the point where the cost of water power equals that of steam or some other power.

The steps recommended for the determining of damage to an established property due to diversion are as follows: Determine the flow, including the effect of storage and pondage, before and after the diversion; the net head; the horse-power which can be economically developed and used before and after diversion (the difference between the power used before and after diversion is the power diverted which causes damage); estimate the additional yearly cost of running caused by the taking away of this power, of coal, attendance and supplies. If any permanent power has been taken—that is, power which can be relied upon in the lowest flow of the stream—estimate the cost of a steam plant or portion of plant necessary to make good the amount taken in the dry month; estimate the fixed charges on this cost of additional supplementary plant; add the extra cost of running and additional fixed charges, and the sum represents the yearly expense. This extra expense, capitalized at a proper rate, represents the damage. The paper, continuing, explains these steps fully, laying stress on the more important and suggesting means for obtaining the requisite data. Examples, with diagrams to assist in calculations, are used to demonstrate the working of the scheme and useful tables to assist in making estimates.

An abstract of the third paper,

"An Indicating Steam Meter,"

by Chas. E. Sargent of the Sargent Engineering Company, Chicago, is given in another part of this issue. In discussing it, G. C. Henning spoke of it as an ingenious device, but was apprehensive for its ability to resist corrosion. He believes, however, that there is a great field for its application. H. H. Supplee mentioned the Gehre steam meter, already in use in Germany for taking the same sort of readings. Its construction is, however, somewhat different, as it uses a templet and a curved dial in place of the geared mechanism in the Sargent meter.

"Staybolts, Braces and Flat Surfaces,"

was the subject of the next paper, by R. S. Hale, engineer of the Mutual Boiler Insurance Company, Boston, Mass., and was a description of various rules and formulæ for the support of flat surfaces of boilers and staybolts. The author's conclusions are as follows: Comparison of the various rules for working stress on stays and braces shows a general neglect of the difference between long and short stays. For long steel stays, subtracting ⅛ inch from the diameter, and then allowing 12,000 pounds per square inch on net section remaining, gives results which apparently will be better than any of the present rules. For iron stays probably 10,000 should be used. For short stays, which are chiefly iron, where bending action comes in, empiric rules reducing stress as length of stay decreases may be used. Our knowledge of the bending stress is not sufficient to warrant the use of a more theoretic formula. Comparison of the working pressures for pitch of stays and thickness of flat plates shows that the complicated formulæ of some of the rules do not give as good results as the simpler formula, $P = C\frac{t^2}{p^2}$, C being taken as 100 to 115 for riveted stays and 140 for stays nutted or crowfoot stays riveted on, and a higher value up to 200 or 250 for the use of washers or channels or angle bars riveted on. If the pitches differ by less than 20 per cent., use the surface instead of p^2. If the pitches differ by more than 20 per cent., it is a special case. Special cases and unusual construction must always receive special consideration. The above constants give results indicating the probable safe pressure for a year or so, until the next examination. In designing a boiler for long life the constants should be reduced by some 20 per cent. or so, just as a factor of safety of 4 can sometimes be used temporarily for the shell of a new boiler, while 5 should be used in designing a boiler to be run for a number of years without reduction of pressure.

In the discussion, G. R. Henderson took exception to the author's statement that bulges in plates have been caused by overheating and that they were due to abnormal conditions, and that they could be prevented by care in operation. As an instance, he mentioned a boiler consisting of a ⅝-inch plate with 4-inch spacing of stays, built for 200 pounds pressure, which gave by the U. S. rule 252 pounds. Nevertheless, the side sheets of the fire box bulged and minute cracks started from the water side. In support of the theory that it was due to the rapid generation of steam from the water next to the inside shell, he explained that gauge cocks were put in extending to within several different distances of the inside shell. When these were opened, while the boiler was being forced, steam was emitted from the longest gauge, showing that no water was in contact with the inner sheet.

Prof. W. T. Magruder of the Ohio State University contributed a written discussion giving tests made on coupons from a sheet that was injured by bulging, which showed that the sheet had lost its ductility. His explanation was that the trouble is due to the existence of water in the spheroidal state.

The last paper of the evening, by Geo. I. Rockwood, Worcester, Mass., on

"Condensers for Steam Turbines,"

was printed in abstract in the last issue of *The Iron Age*, and elicited more discussion than any paper so far presented. He supplemented the paper with the statement that the latest vacuum carried by the condenser was 29 inches with water at 78 degrees F. The suitability of the ejector type of condenser, he stated, lies in the fact that the one point likely to leak air is the spindle of the turbine, and from his experience the air pump used with surface condensers was sometimes the principal source of leakage.

A written discussion, submitted by Francis Hodgkinson of the Westinghouse Machine Company, East Pittsburgh, remarked the unusual vacuum obtained by Mr. Rockwood with an ejector condenser, and without a separate air pump. He thought a very small leak would seriously impair its vacuum, and believed that an air pump added to the installation would insure at least a fair vacuum should any of the apparatus be deranged or small leaks develop, while it would add practically nothing to the operating expense so long as no big leaks existed. Such an equipment would resemble in form a barometric condenser. He called attention to the Westinghouse-Parsons turbine, which exhausts into this condenser, and by test showed a consumption of 12.99 pounds of steam per brake horse-power per hour when developing 588 brake horse-power, and 13.71 pounds when developing 419.8 horse-power. He was surprised at the failure, as reported in the paper, to detect any drop of pressure in the exhaust pipe, which was 16 inches in diameter, 20 feet long and had three short turn elbows, and commented on the ease in being deceived in reading low pressures. An explanation was given of the apparatus he had used for detecting such slight differences in pressure. The following table is compiled as the result of his investigation of the drops of pressures through an exhaust pipe with varying quantities of steam and vacua:

Vacuum at turbine exhaust referred to 30 in. barometer.	Pounds steam per hour from tests.	Drops in exhaust pipe, inches of mercury.	Calculated velocity in 36-inch pipe, assuming 90% quality of exhaust, feet per second.
25.05	16,809	0.12	85.8
25.01	28,902	0.312	146.1
26.05	16,106	0.129	101.5
26.01	28,236	0.3585	176.5
26.95	15,241	0.138	123.6
27.0	21,189	0.276	174
27.0	27,248	0.496	223
26.89	35,297	0.773	279.2
28.0	21,286	0.423	256.0
27.9	24,025	0.478	264.8

The parts of the exhaust pipe, in their order, were: A 32-inch nozzle on the turbine; 32 to 36-inch reducer, 16½ inches long; short turn 36-inch elbow; 20 feet of 36-inch pipe; 36-inch valve (in no place is the area less than that of a 36-inch pipe); 36-inch tee; 12 feet of 36-inch pipe; 36-inch tee; 36-inch gate valve; 5 feet of 36-inch pipe.

Joseph Morgan, chief engineer of the Cambria Steel Company, also submitted a written discussion. He referred to the Broad street plant of the Citizens' Electric Company of Johnstown, Pa., in which Parsons turbines are installed in connection with Weiss barometric condensers. When completed this plant will contain three 400-kw. turbines, exhausting into a condenser sufficient for a capacity of 1200 kw. In selecting this condensing plant, both surface and Weiss condensers were considered, also the cost of operation on the assumption that 50 pounds of water for the surface condensers to 30 pounds for the Weiss condenser per pound of steam were the relative proportions of water required for the same resulting vacuum, and that feed water would cost 7 cents per 1000 gallons in the second case. The working result is over 27 inches of vacuum, with 12 indicated horse-power in the pump engine at 400 kw. on the generator, and deducting the steam utilized in heating the feed water, this is obtained by the expenditure for air and air pumps of about 2½ per cent of the total steam generated. In this arrangement the condenser unit is independently driven by a steam engine at a governed speed and in case of a very sudden increase of load the condenser still receives the same quantity of water; and the vacuum, while temporarily lowered, is not lost as it would be in a jet condenser, having no large condensing chamber, unless the quantity of water is greatly in excess of the average steam requirements. In a steam turbine unit under a jumping load, a jet condenser, therefore, means continual waste of water or occasional disastrous loss of vacuum. An electric lighting plant is, of course, more easy to handle than an electric power plant, as the fluctuations of load are more gradual and can be met by the necessary adjustments of water supply to the condenser. In the Johnstown city lighting plants they are still able to divide the loads among various generators by hand adjustments of field rheostats, but in the Cambria Steel Works power plants there are frequent fluctuations of 600 kw., lasting a few seconds or a few minutes, to which the steam governors must respond, and with variations in steam consumption which any satisfactory condensing plant must take care of.

Mr. Morgan doubts the ability of such a plant as Mr. Rockwood describes to meet such conditions. At the Cambria Works, with jet condensers on automatic rolling mill engines, trouble resulted from their blowing off under sudden loads and they were found wasteful of water, so that they have been replaced by several central condensing plants of the Weiss type. In some of the Weiss units as much as 10,000 horse-power and the steam from 10 large engines is taken into one condenser. Owing to the extent of the piping systems, the large cubic capacity of the exhaust space and the great body of water always in the condensers, the load fluctuations produce relatively small and temporary effects. In some cases the steam is carried through 1500 feet of piping, and very small pipe friction was noted. The exhaust steam, for instance, from a 1200-kw. electric plant is carried through 950 feet of 24-inch pipe, a total distance of 1000 feet, to a central plant at the blast furnaces. This is about 50 per cent. more steam than was originally intended to be put through this pipe, but under extreme fluctuations, the drop momentarily is less than 2 inches in vacuum. In another plant the exhaust steam for a 500 horse-power rope haulage compound engine is carried through 1000 feet of 14-inch pipe to a large exhaust main, and thence 500 feet farther to the main condenser, with excellent results. Mr. Morgan testifies to the very satisfactory result of the water packing on the turbine shafts, as mentioned by Mr. Rockwood. It has been applied to the two turbines at the Citizens' plant, replacing the original steam packing with more satisfactory results as to tightness and saving of oil.

F. M. Wheeler, of the Wheeler Condenser & Engineering Company, New York, stated that the ejector condenser has desirable points, such as simplicity and low first cost, but is open to the objection of liability of water backing up, and has not, in his opinion, the needed flexibility on account of the fixed character of the vena contractor, hence does not adapt itself to varying loads. He stated that he tried some years ago to get a satisfactory ejector condenser. He considers it desirable to have an auxiliary condenser adjustable for varying conditions.

H. H. Supplee mentioned the importance of reading the barometer at the time of taking vacuum records, and also described an augmenter designed by C. A. Parsons for securing high vacua. This consists of an ejector for drawing air from the main surface condenser, the ejector using live steam and discharging into an auxiliary condenser and both being drained by the same air pump. An advantage of the separate removal of air is that it improves the efficiency of the condensing surfaces. George J. Foran of the International Steam Pump Company thought that while the augmenter decreases the size of the air pump required, it does not increase the heat transmitting power of the condensing surfaces. He claims for the surface condenser that it saves feed water, affords high vacuum and allows shorter piping. According to his figures, Mr. Rockwood's installation lifts 1200 gallons of water per minute against 31 feet, amounting to 9½ horse-power, while on an elevated condenser the lift would be 5 feet or 2 horse-power, plus 3 horse-power for the vacuum pump, resulting in a saving of 4½ horse-power.

In closing the discussion Mr. Rockwood stated that the only trouble with air leaks occurred in the drip valves. The additional provision of an air pump with the ejector system, as suggested by Mr. Hodgkinson, he believes should depend upon the value which it has as insurance against decrease of vacuum. He questions its advisability, as the operating expense would be increased by at least the fixed charges. He also holds that the condenser can take an overload, and has found that the discharge of a 6-inch centrifugal pump is readily passed through the 3¼-inch vena contractor of the condenser. The saving of 4½ horse-power in 600 horse-power, suggested by Mr. Foran, he thought of little moment. He believes that the total lift of his installation might have been somewhat reduced.

FOURTH SESSION.

The fourth session, Thursday morning, was again held in Mendelssohn Hall, and the following papers were presented: "Bursting of Four-Foot Fly Wheels," "The Influence of the Connecting Rod Upon Engine Forces," "Losses in Noncondensing Engines," "Power Plant of Tall Office Buildings" and "The Pressures and Temperatures in Free Expansion."

"Bursting of Four-Foot Fly Wheels."

The paper by Prof. Chas. H. Benjamin of the Case School of Applied Science is abstracted in another part of this issue, and is of interest as following up on a larger scale earlier tests made by him on fly wheels of 2-foot diameter or less. In discussing the paper, G. C. Henning drew the conclusions from the tests that a steel rim fly wheel was the more economical and safe. The author's statement that the balace weight applied to a wheel is objectionable was supported by G. R. Stetson of New Bedford, Mass. He suggested that in some cases the failure of fly wheels may very probably be caused by the heat of friction due to the slipping of the belt, citing instances within his knowledge where such heat was considerable and sufficient to expand the rim of the fly wheel. In the course of discussion, when a fly wheel too large to be cast in one piece was considered, it was suggested by one speaker that the ideal form would consist of a wheel made up of segments, the joints of which pass through the centers of the arms instead of half way between them, the bolt flanges being cast on the arms. This gives each segment a triangular form, which is recognized as a strong mechanical construction.

"The Influence of the Connecting Rod Upon Engine Forces."

The second paper was contributed by Sanford A. Moss of the turbine department of the General Electric Company, West Lynn, Mass. In it the author deduces a

method for determining the influence of the weight and inertia of the connecting rod upon the forces transmitted by the ordinary train of mechanism used in steam and gas engines. On the basis that the connecting rod may be considered partly as a rotating part concentrated at the crank pin and partly as a reciprocating part concentrated at the cross head pin or wrist pin, which takes account of its weight and inertia effect almost exactly, the problem is analyzed mathematically, illustrated with diagrams, and equations are derived. The author's results are summarized as follows: l being the distance from center to center of connecting rod, a the distance from center of gravity of rod to wrist pin, b the distance from center of gravity of rod to crank pin, and K the radius of gyration of rod about an axis through the wrist pin. A fraction of the connecting rod weight $\frac{K^2}{l^2}$ is to be counted as a rotating part, concentrated at the crank pin, and counterbalanced with the other rotating parts. When this is done, there is no shaking force on the engine bed due to the inertia effect of the rod on the crank pin, and practically no turning moment on the crank shaft due to the weight of the rod on the crank pin. The given fraction of the rod comes out nearly one-half in ordinary cases, and this value may be assumed if the radius of gyration is not known. In an average case the given fraction of the rod is about eight-ninths of the partion of the rod whose weight is supported by the crank pin $\frac{a}{l}$. The remainder of the rod weight after the fraction above given as a rotating part has been taken out—that is, the fraction $l - \frac{K^2}{l^2}$, is to be counted as a reciprocating part concentrated at the cross head pin or wrist pin. When this is done, the usual methods of computing the counter balance and the forces required to accelerate the reciprocating parts will give correct results. The given fraction of the rod comes out nearly one-half in ordinary cases and this value may be assumed if the radius of gyration is not known. In an average case the given fraction of the rod is about one and one-eighth of the portion of the rod whose weight is supported by the wrist pin $\frac{b}{l}$. The total cross head weight pressing on the guides in horizontal engines or the downward force due to the weight of the reciprocating parts in vertical engines is to be found by including the fraction $\frac{b}{l}$ of the connecting rod weight. However, in most cases, it will be sufficiently accurate to include the same fraction of the connecting rod as is used for the inertia effect.

"Losses in Noncondensing Engines."

The second paper, by James B. Stanwood of the Houston, Stanwood & Gamble Company, Cincinnati, was a theoretical and thermodynamical analysis and discussion of the relation between the condensation and expansion losses which occur in noncondensing engines. Tests of a few leading types of these engines were employed to determine the current practice, and some of the conditions governing steam economy under varying loads were given. The author is to be congratulated on the admirable manner in which he has made clear this more or less abstruse problem and brought it within the comprehension of the average technical man. The paper is logically arranged, each step carefully explained and frequent reference made to other sources of information on special points. The table calculated by the author from Peabody's steam table gives the absolute pressures and temperatures in connection with their respective entropy values of water and steam, and will be extremely valuable in the calculation of heat exchanges, as it replaces in much simpler form the steam and hyperbolic logarithmic tables usually necessary. The use of the table is carefully explained. Several other tables are included in the paper with curves and diagrams which are intended to reduce the labor in figuring heat losses.

"The Power Plant of the Tall Office Building."

The third paper, presented by Sterling H. Bunnell of the Watertown Engine Company, Watertown, N. Y., was mainly a comparison between compound and four-valve simple noncondensing engines, as used in tall office building power plants. His deduction was that compound engines for this service often give results inferior to those of the single cylinder engines with a better valve gear, costing considerably less to construct. In the paper he makes use of tests made on 17 different plants in office buildings by Isaac D. Parsons, and data obtained from these are tabulated in convenient form for determining the actual cost of current as compared with the rates charged by central stations. The items making up the cost of current are taken as labor, coal and handling of ashes, water, lamps, oil and supplies, repairs, central station service where used for periods of minimum consumption to allow the shutting down of the plant, and interest and depreciation at 6 per cent. per annum on original cost of plants. Roughly these figures average: Labor, one-third; coal, one-third, and interest and depreciation, one-tenth to one-third. The variation of load in office building power plants constitutes one of the difficult conditions affecting the selection of equipment. The paper states that in the average case the minimum load is from 10 to 20 per cent. of the maximum. Consequently, it is evident that the mean load is only about one-half the full load, and it is desirable that the engines should be designed for their best economy at some point considerably below their maximum power, and to operate with reasonable efficiency over a wide range of load. Indicator card diagrams taken from Watertown engines of the high speed noncondensing type were used to show their performance. These engines were supplied with steam at a pressure of 110 pounds, and exhausted against a back pressure of 5 pounds in the exhaust pipe and about 7 pounds in the cylinder. Three engines were selected for the comparison, a 10 and 18 x 12 inch tandem compound, each cylinder having a single steam valve driven from the governor; a 13 and 22 x 14 inch tandem compound with single valve cylinders, with the low pressure valve driven from the eccentric, the high pressure only being connected to the governor; a 20 x 18 inch single cylinder valve engine with valves placed close to the bore of the cylinder to reduce clearance, the exhaust valves being driven by the fixed eccentric and the inlet controlled by the governor. The results were given for very light load, the most economical load and the maximum load, and indicated that the single four-valve engine has a greater range of capacity with reasonable economy than the noncondensing compound engine, and for the actual conditions of service in power plants of large buildings is to be preferred.

J. B. Stanwood submitted a written discussion in which he used the analysis described in his own paper to calculate the cylinder efficiencies of the engines described in Mr. Bunnell's paper. With the data, he plotted curves for one of the compound engines and the simple engine, which showed plainly the advantage of capacity possessed by the simple engine and efficiency by the compound engine. He criticized Mr. Bunnell's assumption of condensation loss at 20 per cent. with equally light loads for both types of compound engine, and stated that as the engine with governor controlling only the valve gear of the high pressure cylinder has a greater temperature range at light load than the other, it would probably be found in practice to have a greater initial condensation than the engine in which the valves of both cylinders are under governor control. He also objected to the boiler pressure used as too low to get the best results with compound engines of the cylinder ratio given. That is, 2.6 to 1. He would advise for high back pressures a cylinder ratio of about 2 to 1, as it would give the capacity with only a slight reduction of economy over the larger ratio.

F. H. Ball of the American Engine Company, Bound Brook, N. J., in discussing the paper, showed a chart giving the performance of several engines, tests of which are to be found in Geo. H. Barrus's book, "Engine Tests," the ordinates being water rate and the abscissæ per cent. of load. Most of the engines were of the Corliss type, operating noncondensing. The range of load was about 15 to 115 per cent. of the rated load and the water rates 73.63 and 25.39 pounds respectively per indicated

horse-power per hour. His opinion was that the short stroke four-valve engine could not give as good a performance as the Corliss engine. In reply, Mr. Bunnell emphasized that in the service considered, the conditions were very special.

"Pressures and Temperatures in Free Expansion."

The last paper of the session was presented by Chas. E. Lucke, of Columbia University, in behalf of the authors, A. Borsody and R. C. Cairncross. The work was part of a thesis problem consisting of a series of charts and tables of measurements on the pressures and temperatures in free expansion of both air and steam in the ordinary De Laval nozzle. It was found that relatively the temperature change was so small that the expansion could not be regarded as solely a transformation of heat energy. R. P. Bolton of New York City remarked the similarity of the reducing valve as used in heating work to that of the steam jet, and stated that when live steam had to be used for warming a building more fuel was required than when exhaust steam was used for the purpose. Prof. F. R. Hutton expressed the belief that the line of investigation might be of ultimate importance in the solution of the gas turbine, where the trouble is that the temperature drop is not relatively great and the exhaust is altogether too hot.

As on the previous day, the members adjourned to the Society's headquarters for luncheon.

THURSDAY AFTERNOON AND EVENING.

In the afternoon the members and guests were invited to inspect the power station of the subway division of the Interborough Rapid Transit Company and also that of the New York Edison Cmpany. A number took advantage of the courtesies extended and were divided into parties, about 15 persons each, starting a few minutes apart, so that all might have an opportunity of seeing all that they wished and asking questions. The Interborough station, as is known, contains the largest engines ever built, these being of a type exhibited by the Allis-Chalmers Company at the recent St. Louis World's Fair. At the Edison station the visitors had an opportunity of seeing a Curtis steam turbine in operation.

In the evening the only social affair of the meeting, the annual reception by the president and president-elect to members and guests, was held at Sherry's, followed by dancing.

THE FINAL SESSION.

The concluding session was held Friday morning at the Society House, the following papers being presented: "Fuel Consumption of Locomotives," "Road Tests of Brooks Passenger Locomotives," "A Bad Case of Discharge of Water with Steam from Water Tube Boilers," "More Exact Methods of Determining the Efficiency of Steam Generating Apparatus," and "The Forcing Capacity of Fire Tube Boilers."

"Fuel Consumption of Locomotives."

The first paper by George R. Henderson of Philadelphia, on locomotive fuel consumption, contained numerous diagrams, the use of which was explained in determining the qualifications of a given locomotive for a given class of service. The first of these gave the maximum evaporation per square foot of heating surface per hour in terms of pounds of water evaporated and the ratio of heating surface to grate area; the second, coal consumption in terms of tractive force in pounds and miles per hour; the third the evaporative value of coals in terms of water rate and pounds of coal per square foot of heating surface per hour.

In discussing this paper Professor Carpenter praised the method presented as one of permanent value for estimating the performance of locomotives, and commented upon the enormous quantities of coal which may be burned per hour in locomotive practice, these being not even approximated in any other service. From tests in stationary practice where a forced draft is employed he obtained the following as the pounds of coal of various grades which may be burned per square foot of grate per hour:

	Pounds per square foot of grate per hour.
Bituminous slack	28
Anthracite, Buckwheat, No. 1	18
Anthracite, Buckwheat, No. 2	14
Semi-anthracite, pea (Loyal Sock)	20
Semi-anthracite, dust (Loyal Sock)	12

These results, compared with those given in Mr. Henderson's paper, show that the relative amounts of the different kinds of coal which may be burned may be materially changed by changing the draft conditions.

"Road Tests of Brooks Passenger Locomotives."

The paper by Prof. E. A. Hitchcock gave the results of work done by students at the Ohio State University. Two locomotives were used of practically the same dimensions, one however being fitted with a Belpaire type of boiler and 72-inch drivers, and the other with a Wagontop boiler and 66-inch drivers. The first had been in service several years, but was thoroughly overhauled nine months previous to the trials, while the other was practically new. The results of the tests were given in two large graphical logs, giving the grades of the road, miles per hour, steam pressures, initial pressure, total horse-power, the position of the reversing lever, smoke box draft and smoke box temperatures.

"Discharge of Water With Steam from Water Tube Boilers."

The third paper, by Alberto Bement of Chicago, described an investigation to determine the best location of baffle plates in the steam drum of a water tube boiler to prevent the discharge of water with the steam. A small model boiler constructed to scale from one of standard size was used which had a transparent glass steam drum. The study was provoked by trouble had with two engines in a large electric generating plant. The trouble was from water which caused failure in the lubrication of the valves, resulting in their not closing and in the breaking of the valve arms and caused the joints between the cylinder and heads to leak continuously, in spite of frequent repacking. The amount of water passing the high pressure cylinders was so great that the drains from the intermediate receiver were not sufficient to remove it. The paper contains a series of diagrams showing the resultant currents of water and steam with baffles of various forms in the steam drum. There are also the results of several investigations into the effect of drafts of steam on priming, calorimetric determinations and the performance of large separators.

"More Exact Methods for Determining the Efficiency of Steam Generating Apparatus."

The next paper was by the same author, and as he stated was presented to suggest the advantages of more detailed study of steam generating apparatus. He gave the results of tests on two boilers, of horizontal water tube type, located side by side in one battery, and each provided with a chain grate stoker. All conditions were practically the same except that in boiler A the gases traveled with the length of the tubes once and did not act on all of the tube surface, while in boiler B the travel was three times the length of the tubes in separate passages. The temperature of the escaping gases was 657 degrees F. in boiler A, or 582 degrees above the air supply and 278 degrees above the steam temperature, and 469 degrees in boiler B, or 394 degrees above the air supply and 92 degrees above the steam temperature, making the excess temperature of the gases of A over B 186 degrees. In a separate test of the same boilers, which had 4800 square feet of heating surface each, 7.47 pounds of water were evaporated per pound of pure coal, or combustible, which had a heating power of 13,633 British thermal units per pound, in boiler A and 9.42 pounds in boiler B. The temperature of the feed water was 212 degrees, the temperature of the escaping gases, 594 degrees and 442 degrees in boilers A and B, respectively, and the draft over the fire 0.38 and 0.22 inch in boilers A and B, respectively. The horse-power developed was 383 in A and 395 in B; the efficiency, or percentage of heat absorbed by the boiler, 52.93 in A and 66.73 in B; the fuel saving of boiler B over boiler A was 20.68 per cent.

"The Forcing Capacity of Fire Tube Boilers."

The last paper was presented by F. W. Dean of Dean & Main, Boston, Mass. In it he endeavors to show that the prevailing opinion upon the relative forcing capabilities of water tube and fire tube boilers is incorrect, in substantiation of which he gives the particulars concerning several boiler tests upon different kinds of fire tube boilers made by others and himself. He explains that the ability to stand forcing is the capacity to evaporate much more water than the rated power of the boiler would require, which is often 20, 50 or even 100 per cent. in excess of the rated requirements, and depends upon the amount of fuel consumed in a given time. One reason advanced for the superiority of the water tube boiler is that it contains less water in proportion to the heating surface than the fire tube boiler, but by actual investigation of a number of standard makes of both types the author finds that water tube boilers generally contain more water per square foot of heating surface than fire tube boilers. However, he goes on to show that the quantity of water contained by a boiler has no effect upon forcing capacity after steam is once up to the working pressure. He also states that the claim of advantage due to the flame entering among the tubes of a water tube boiler is in reality a disadvantage. Still another claim is that the gases impinging against water tubes give up more heat than they would if they passed parallel to them. The author considers it a fallacy, since gases give up heat because their temperature is higher than that of the heat receiving medium, and not because they are thrown against this medium. The paper contains tests of a number of horizontal return tubular boilers, all of which show a remarkable forcing capacity.

A. H. Eldredge, consulting engineer, Swift & Co., Somerville, Mass., considered Mr. Dean's paper of great importance and called attention to many other considerations of equal or greater weight in deciding the choice of boiler. In 1901, on a plant of nearly 3000 horse-power of water tube boilers, he had 75 tests made to determine the comparative values of different Western fuels. One boiler was fitted up with scales, tanks, pump, &c., for the work and was handled exactly as the rest of the battery. In only three tests, with the poorest coals, did the boiler simply reach rated horse-power, while in most tests it ran from 25 to 60 per cent. over capacity, and in a few cases ran over 85 per cent. above rating. These boilers are now eight years old and have been pushed this way day and night with poor feed water, and are still carrying 150 pounds pressure, with every indication that they will continue to do so.

Professor Carpenter thought that the author's impression that the forcing capacity of fire tube boilers is not appreciated is erroneous. His experience has indicated the reverse.

The session was concluded with the consideration of business matters, including the preliminary report of the committee appointed to suggest a standard tonnage basis for refrigeration and an appendix to the report of the Committee on Standardization of Engines and Dynamos. The first committee consisted of D. S. Jacobus, chairman; E. F. Miller, P. D. C. Ball, A. P. Trautwein and Gardner T. Voorhees, and the second of James R. Stanwood, chairman; W. M. McFarland, A. L. Rohrer, Frank Ball and W. B. Forbes.

The spring meeting of the society will be held at Scranton, Pa.

The Canadian Westinghouse Company, Limited, has sold to the Hamilton Cataract, Power, Light & Traction Company, for use in its Victoria substation at Hamilton, Ontario, two motor generator sets, each consisting of a synchronous motor and a direct current generator. The motor generator sets will be of the two-bearing type, the generators delivering direct current at 550 volts to the railway system, and each being rated at 750 kw. The synchronous motors will take two-phase current at 8000 alternations and 2400 volts, and will be rated as 1380 horsepower. These sets will be built at the works of the Westinghouse Electric & Mfg. Company at East Pittsburgh, Pa.

The Engine Builders' Association.

On December 9 and 10 the annual meeting of the Engine Builders' Association of the United States was held at Sherry's, New York City. The sessions were well attended, and a large number of nonmembers were present at the opening session and participated in the discussion of the several papers read. The session on Saturday was executive, and was a most interesting one. The Committee on Sales and Contracts, which is composed of Wm. M. Taylor of Chandler & Taylor, Indianapolis; E. H. Sniffen of the Westinghouse Machine Company, Pittsburgh, and Nathan B. Payne of the Payne Company, Elmira, N. Y., reported a standard form of contract, which was adopted by the association. This is a conditional sale contract, giving better protection to the builders of the engine and embodying features which for the lack of united action engine builders have been unable to enforce uniformly. It eliminates a number of features embodied in some engine contracts which are regarded in the nature of concessions by certain engine builders.

In view of the lack of uniformity among engine builders in the price of erection of engines, a standard price per day which should be charged for the services of the erecting men was decided upon.

A table of standard sizes for bolt holes for the attaching of the engine to the armature of the generator in the case of direct connected units was also adopted.

A committee was appointed to confer with the American Institute of Architects with a view to arriving at some understanding concerning certain features of engine specifications where the engines are placed in large buildings under the direction and supervision of the architect. The election of officers for the ensuing year resulted as follows:

C. A. Gates, Russell Engine Company, Massillon, Ohio, president; Thomas C. Wood, Ball & Wood Company, Elizabeth, N. J., vice-president; Arthur L. Merriam, Ames Iron Works, Oswego, N. Y., treasurer; Nathan B. Payne, the Payne Company, Elmira, N. Y., secretary. C. S. Bonsall of the Buckeye Engine Company, Salem, Ohio, and H. C. Nichols of Nichols & Langworthy, Hope Valley, R. I., were elected to the council. The other members of the council are J. I. Lyle of the Buffalo Forge Company, Buffalo, N. Y.; Nathan B. Payne, the Payne Company, Elmira, N. Y.; S. F. Begg, Watertown Engine Company, Watertown, N. Y., and Walter C. Kerr of the Westinghouse Machine Company, Pittsburgh, Pa.

After the address of welcome delivered by President C. A. Gates at the opening session on Friday the following papers were presented: "Costs," by C. M. Lauer, Philadelphia; "The Steam Turbine," by F. C. Bates, New York; "Employers' Associations," by Chas. L. Eidlitz, New York; "Salesmanship as an Applied Science," by R. U. Conger, New York.

A German syndicate has purchased the street car lines of Rosario, Argentine Republic, with the intention of changing the motive power from mules to electricity.

The Electric Controller & Supply Company, Cleveland, Ohio, has just shipped the second of two 200 horse-power 220-volt type M. T. magnetic switch controllers to the Lorain plant of the National Tube Company. They are for the control of the reversing motors driving the tilting tables on each side of the plate mill. These controllers give automatic acceleration, which can be adjusted to the maximum rate consistent with safety to motors and gearing. Other recent shipments of controllers of this type have been made to the Carnegie Steel Company, the Lackawanna Steel Company and the Illinois Steel Company.

The bauxite brick referred to in a recent issue of *The Iron Age* are made for the American Bauxite Company, Whipple Building, Little Rock, Ark., by the Laclede Fire Brick Mfg. Company, St. Louis, Mo.

An Otis electric elevator was shipped December 2 from Yonkers, N. Y., to the grand cathedral at Berlin for the exclusive use of the German Emperor.

The Iron Age

New York, Thursday, December 15, 1904.

DAVID WILLIAMS COMPANY, - - - - - - - - PUBLISHERS.
CHARLES KIRCHHOFF, - - - - - - - - - EDITOR.
GEO. W. COPE, - - - - - - - - - - ASSOCIATE EDITOR.
RICHARD R. WILLIAMS, - - - - - - - - - HARDWARE EDITOR.

The Increasing Tonnages of Steel Required by Railroads.

Railroads are at present the largest users of iron and steel, and their recent policy of restricting their purchases only to their actual necessities is responsible, more than anything else, for the slackness in mill orders during the last 18 months. But all this time the railroads have been piling up their needs, and when these wants shall be met they will be greater than when they first developed. To be more explicit, rails and bridges that should have been bought in 1903 and 1904, when they are bought in 1905 will rule 10 to 20 per cent. heavier than they would have been if they had been ordered when first needed. This increase in weights of rails and bridges is necessitated by the constantly increasing tonnages of locomotives and cars made obligatory by the necessity of decreasing the ton-mile cost of handling freight.

As mileage can be reduced only fractionally, and then at immense cost through eliminating curves and grades, the only means by which railroads can reduce their ton-mile cost is by the use of heavier and more powerful locomotives and heavier and more capacious cars. It was not many years ago that the minimum freight carload was 12 gross tons, or 22,400 pounds. A little later this was increased to 15 net tons, or 30,000 pounds, and this minimum has increased until many roads schedule 40,000 pounds as their minimum carload. Maximum carloads have increased in the same proportion and now range from 60 to 100 net tons on coal and ore carrying roads and 40 to 60 tons for ordinary commercial freight.

To draw trains of the heavier cars locomotives have increased from 150,000 to 175,000 pounds weight in the '80's to 350,000 to 400,000 pounds weight to-day, and the limit has not yet been reached.

Roadbeds and bridges have had to be strengthened to accommodate these increasing loads. Rails bought to-day for trunk lines range from 80 to 90 pounds to the yard, and in some instances 100 pounds and heavier, whereas the rails that are being taken up and sold for scrap after 8 or 10 years' service range from 50 to 70 pounds. For the same reason railroad bridges that would otherwise have many years of service before them are being scrapped and replaced by heavier structures. Until recently railway bridges were built for a maximum live load of 3500 pounds per lineal foot, and that was thought to be sufficient for all possible increase in tonnage during the natural life of the structure; but to-day trunk line bridges are designed for live loads of from 6000 to 7500 pounds per lineal foot. The increasing weight of iron and steel for railroad purposes does not stop here. As train loads increase it becomes necessary to increase the strength and consequently the weight of the draw bars and couplings of all cars that are intended for general traffic, as well as the framework of the cars themselves. A 12-ton capacity car of 20 years ago would pull apart like a lunch box if put at the forward end of a modern heavy trunk line freight train.

It will thus be seen that the railroads are consuming constantly increasing tonnages of iron and steel in proportion to their mileage, and that this tendency will continue until the highest factor of efficiency and consequently the lowest possible ton-mile cost of haulage is reached. It is not merely a matter of replacing rails and bridges, locomotives and cars with heavier ones when the old ones are worn out, but it is more frequently a case of discarding the old for the new before the old equipment has seen half the years of its intended service. Freight cars cannot be made much longer or wider than the present maximum as long as existing curves have to be negotiated, but they may be made higher, because the almost universal use of the air brake no longer makes it necessary to allow for the brakeman between the car roof and the overhead bridge or viaduct. Their carrying capacity is also being augmented by the substitution of steel for wood. The steel car industry has already become one of the largest consumers of steel in the country, and the advantages of the steel car outweigh its disadvantages to such an extent that each year steel is being used more and timber less in the construction of freight cars. When one considers that the normal life of steel rails, and probably on an average of all other steel and iron materials that enter into American railroads, is ten years, and that, therefore, of the millions of tons now in use 10 per cent. must be replaced annually, to say nothing of the increasing mileage and the necessity of replacing so large a proportion of the equipment long before the ten-year life has been lived, there is much encouragement to the steel maker.

The Liability of Employers.

The President's recommendation "that the Congress appoint a commission to make a comprehensive study of employers' liability with the view of extending the provisions of a great and constitutional law to all employments within the scope of Federal power" can hardly fail to meet with the approval of employers of labor everywhere in the country. The employers' liability acts of most and probably of all the States of the Union have worked out very unsatisfactory results. They are exceedingly complicated, with widely varying precedents. They permit legal technicalities to govern many decisions, regardless of moral justice. Jury awards are often excessive, there being little restraint to results obtained by appeals to the sympathy of jurors.

There is absolutely no means of foretelling the outcome of a trial of such causes, and consequently the element of gambling exists to an almost alarming extent, for lawyers of a certain class, oftentimes very bright men, have been led to accept and even to solicit practice on a contingent basis, the lawyer to receive a substantial percentage of the award if the plaintiff wins, or to give his services free if the decision be an adverse one. Such practitioners go so far as to advance the necessary funds for the payment of court fees, expecting to be reimbursed out of the jury's award of damages. Manufacturers everywhere suffer from this abuse as well as from the other general weaknesses of employers' liability acts as they exist to-day. Much antagonism between employer and employee has naturally arisen from these conditions.

The Federal Government has not the power to make laws governing employers' liability in the States excepting under certain conditions. An act with a scope as broad as that of the bankruptcy act would probably not be constitutional. But the influence of a national act "within the scope of the Federal power" would be very

great if it was wisely and simply framed, and so, too, would be the influence of a report of a commission made up of able men, properly equipped for the task, who would go right into the question carefully and with due regard for the rights of all parties that would be affected. Very interesting experiments with workmen's compensation acts have been made in Great Britain and on the Continent, and the commission might very well look deeply into a system which defines with some degree of exactness the financial limits of an employer's liability. A law might be framed that would be nearer perfection than anything that exists to-day in that it would include only that which practice has demonstrated to be the best.

Conservatism Needed by Lake Ore Producers.

Iron ore shipments from the Lake Superior mines are over for this year, with the exception of what little ore is to go to furnaces all-rail during the winter. The total is about 21,000,000 gross tons, which is 3,500,000 tons under last year, and 6,500,000 tons under 1902. It is conceded by all that the ore business of 1902 was excessively large, and that the only reason for such a tremendous shipment that year was the formation of the various consolidations. These consolidations, with their general desire to make big showings and their necessarily optimistic ideas of the future, had every reason to make an immediate jump forward. Many outside of these combinations were afraid of the ore supply and seemed to want to lay in as much raw material as possible. Everything tended to an oversupply, with the result that far more ore was taken down the lakes than was needed, and for this oversupply the trade has since been paying the penalty in shrunken business and depressed prices.

It is apparent that the shipments of 1904 have been nearly as far under the market as those of 1902 were above it, and the balance has been regained. A proof of this recovery of balance is the increased activity in the iron trade with the renewed life in the ore business. If facts as to recent action by individual furnace companies of the East in the matter of belated ore purchases were to be printed there would be seen an astonishing jump of many concerns in their demand for ore and in the price they are willing to pay. When the end of the season drew near and concerns that a few weeks before had considered themselves supplied till the opening of navigation found they wanted ore, the number of sellers was unexpectedly limited, and these sellers were not especially anxious, not nearly as anxious as a few months before. They held off, alleged car shortage, mine inability, &c., in a way that was exasperatingly tantalizing.

Now there is talk of a shipment of 30,000,000 tons for next year. This is extravagant and it is time for sanity all along the line. If there had been a gradual increase in Lake Superior business for the past four years, such an increase as the market warranted, say from 20,000,000 tons in 1901 to perhaps 23,000,000 tons the next year, 24,000,000 tons the year after, and 25,000,000 or 26,000,000 tons for 1904, the amount shipped would have been sufficient for the market, would have steadied things in the steel trade, would have benefited both miners and steel makers by millions of dollars, and would have maintained the mine labor situation at its desirable even keel. It would seem to be most inadvisable to duplicate the experience of 1902-3, particularly when its lessons are so fresh, and boom ore shipments in 1905, only to fall down again in 1906. Ore miners have not so much in reserve nor do they know where they can get more so readily as to warrant them in such imprudence. The ore that is shipped is gone forever and brings no more money to the producer. If every ton should be made to contribute its reasonable share, the whole would be none too much and the iron industry in its every branch would be more likely to prosper.

Rapid Advances in Rubber.

Manufacturers of articles in which rubber is used are confronted by radically increased costs on the raw rubber. Notwithstanding the fact that the production of rubber is increasing rapidly each year, the increase in consumption is in a ratio so much larger that prices are mounting skyward, and there is no little danger of an actual shortage. The highest price for pure Para rubber in 1880 was 50 cents per pound. The average price from 1885 to 1892 was 76 cents. The price in March, 1902, was $1.02. The price November 1, 1904, was $1.13, and prices quoted the past week range from $1.30 to $1.32½. These prices are all f.o.b. New York in car lots. At no period since rubber has been a large commercial commodity have price increases been as startling as during the last few months. During the month of November a total of 14 cents was added to the wholesale prices.

There are a number of natural reasons for this increase in the price of rubber apart from whatever manipulation may be present in the market. The small item of rubber heels to shoes has consumed quite a tonnage. Automobile tires call for the purest rubber in a larger proportion compared with adulterants and fabric than in most other arts. The widespread use of rubber tires for carriages and other vehicles consumes to-day a greater tonnage than the total importation of rubber 20 years ago. It is estimated that last winter no less than 60,000,000 pairs of rubber boots and shoes were manufactured and sold. The rubber industry is daily assuming larger proportions and greater importance, and rubber is finding its way into a countless number of manufactured products in which it was not used some years ago. The rise in the price of raw rubber is therefore quite in line with the progress of the industry.

New England Suffers from Drought.

The scarcity of water in New England, while not so serious as reported from other parts of the country, is such as to cause much uneasiness. The large cities generally are better off than smaller communities. Boston and its suburbs are supplied from the metropolitan water system and there is little chance of a famine. Worcester has a supply for two months only. The storage capacity of the reservoirs of smaller places is not adequate for a time of serious drought, and consumers have been warned to be economical. In some places the authorities are considering the stoppage of hydraulic elevator service. Manufacturers who require large quantities of water may be seriously handicapped unless there are rains, which would be unseasonable in the New England climate and are therefore not expected, or heavy thaws after snowfall, which usually do not come until the middle of January, and even later in severe winters.

Water power has given out pretty nearly everywhere, and when this happens in the early winter there is little hope of a renewal before spring. The winter rains and thaws temporarily fill the streams and reservoirs, but do not get into the soil to replenish the springs, the source of constant water power. The past few years have seen

a great many manufacturing plants install complete steam plants for use in just such an emergency as this. In fact, on many streams water power that was formerly regarded as the main supply is considered as auxiliary, partly because more power is needed and partly because more frequent droughts have made it necessary to use full steam power much more often than was formerly the case.

An unfortunate error was made in our last issue in the editorial headed "The Financial Reports." The statement was made that the Secretary of the Treasury "estimates the deficits for the current and ensuing years at $18,000,000 and $22,000,000, respectively." It is correct that the Secretary estimates a deficit of $18,000,000 for the current fiscal year, but he estimates a surplus for the fiscal year ending June 30, 1906, of $22,350,147.79.

Lake Iron Ore Matters.

A New Late Record for Ore Shipments.

DULUTH, MINN., December 10, 1904.—A few belated shipments of ore left Duluth, Missabe & Northern docks as late as December 9, making the total for that road for the year 4,650,000 gross tons. This is in comparison with a total of 5,350,000 tons last year. The road moved about 50,000 tons in December, shooting up its earnings for the month in a most astonishing manner, for December is usually a month between hay and grass, after the close of the ore traffic and before the log business has begun. A few grain ships left Duluth on the 10th, and can hardly make Buffalo before the 13th, putting a late close to the season of navigation. Never before has there been ore shipment after December 6.

Talk of ore prices for the coming year is rife. Mining interests at this end look for less difference between Bessemers and non-Bessemers than last year, and this would be a most reasonable conclusion. The differential was altogether too great. Mesaba Bessemers are now selling at a price that presages $3.50 for the year, and for non-Bessemers about $3.10 to $3.20. There is little change between Old Range and Mesaba non-Bessemers, with a slight advantage for the former. Old Range high grades are liable to settle at $4, or a few cents better. These advances are less than could be secured, but they are all that conservative mining operators think they should have. The jump in the final few days of the season of navigation and the frantic efforts of some short sighted furnacemen to fill up for the winter have shown what might be done in ore if it were advisable that the screws should be put on.

Preparations for Next Year.

From the preparations making by iron ore roads for next year it would look as though the shipments were expected to be larger than any conservative estimates have figured. The two United States Steel roads in Minnesota are spending, as has been noted, about $2,000,000 for equipment and docks, and both are to maintain a large force of men in shops and elsewhere all winter getting stock fit for the strain. In spite of their recent dividends of 150 per cent. on capital stock, aggregating about $8,500,000, they had at the close of the last fiscal year a combined surplus of about 100 per cent. These dividends are of very infrequent occurrence, the Duluth & Iron Range having made but four, none so large as this last, during its 20 years of existence. If the ore traffic of 1905 amounts to 27,000,000 tons, not less than 17,000,000 tons will be from Minnesota, and of this these two roads will carry probably about 75 per cent. So they do well to prepare. Other roads from Escanaba to the Western Mesaba are getting ready for a large business.

The Shenango Furnace Company (W. P. Snyder & Co.) will probably open its Webb mine, near Hibbing, this winter. This is a large deposit of medium grade ore bought by the Shenango people two years ago for $280,000. It will be an underground mine, and is on the lines of the Duluth, Missabe & Northern and Great Northern roads. Among other mines liable to be opened for the coming year is Wakouta, which is a State lease held by the La Belle Iron Works. It would have been opened two years ago but for the fact that the company was held up in the location of a stripping dump. The deposit is not large, but is of good grade, and lies a short distance from the Mountain Iron.

The Cleveland Cliffs Iron Company has begun suit against the East Itasca Mining Company for $92,000, on account of alleged overpayment on the lease of what has been known as the Crosby mine, in section 32-57-22. The facts were briefly referred to at the time the Cleveland Cliffs Company took the mine two years ago, but will bear rehearsal, for they point an unusual moral. The mining company took the property on the basis of owners' estimates of tonnage, based on drill showings, and paid a 7-cent advance royalty, and agreed to continue explorations and make payments for whatever more ore might be discovered, at the same rate and as fast as found, in semiannual settlements. There was also a 25-cent royalty to the fee holders, from which the East Itasca Mining Company was original lessee. The company commenced stripping the mine and soon found that ore was deposited in what may be described as fingers, and that the original exploration had followed these fingers closely, so that it had appeared as though the ore body was continuous between them, when it really was not so. Stripping ceased and an effort to secure a settlement was undertaken. It seems that the tonnage apparently in sight by the East Itasca explorations was nearly 1,500,000 tons greater than that actually existing. No one considers that the East Itasca Company acted in bad faith, and the whole matter is an unusual example of unfortunate exploration. In the whole history of the Mesaba range there has been only one prior case of final explorations turning out so unfavorably in comparison with preliminary work.

Exploration and preliminary work have begun at the old Kloman mine, Marquette range, which is under option to the Flagler Steel Company, whose decision to erect a steel plant at Waukegan, Ill., has been announced by the daily papers. At the Chapin Hydraulic Works, partially destroyed by fire two weeks ago, repairs are nearly completed and one compressor is already running. The mine has been working steadily and the gross loss by the fire was less than $9000.

Canadian Iron Ore Developments.

Reference has been made at various times for some years to the iron ore deposits of the Atikokan district, north of Minnesota, in Ontario. This is a magnetite formation, extending for many miles along the river of that name, and with a bold exposure that shows high grade iron. This has been drilled and otherwise explored, and that there is an abundance of ore in the range seems to be assured. Efforts are now being made looking toward the development of this iron district, and with good chances of success. Jas. C. Hunter, a banker of Duluth, and one of the owners of what is possibly the most valuable part of the range, has been at work for some months enlisting capital in a plan for the establishment of an iron and steel industry in Canada, the Atikokan ore to be the basis of the development. He has enlisted the aid of promoters of the Canadian Northern road, and has recently been at Toronto, Ottawa and Winnipeg with them. These ore deposits are near the line of the Canadian Northern, and that road has guaranteed freight rates and to handle the tonnage that may be derived from these properties at Port Arthur, Ont., on the north shore of Lake Superior. It is about 100 miles from the Atikokan to Port Arthur, practically the same as from Vermillion mines to the lake. The plan under discussion calls for the establishment of industries at some point on the lakes, not yet announced, and the ultimate erection of mills for the manufacture of steel products, as well as for intermediate material. It is understood that none of the existing large works, either in the United States or Canada, is interested in the project.

Another Ontario project is just now undertaken by a group of Northwestern men, who have secured from the Government mining licenses for a three-year term of a certain area of denounced lands on Hunter's Island, on the international boundary, where they will explore.

They have agreed to spend $120,000 in these explorations. The ore mined is to be smelted in Ontario, whenever practicable, under the terms of their concession. These men are F. E. Kenaston, F. B. Wood, H. A. Hunter, H. Richardson and Q. U. Quackney of Minnesota, W. H. Phipps of Wisconsin and W. B. S. Trimble of North Dakota, who have made a large amount of money in recent years by farm land speculation in the Northwest. In this connection it might be stated that the work of the International Iron Company on Hunter's Island, which has been under way for about a year, is not proving any great value for that company's selections, all of which were made some time ago and have been supposed to be among the best looking lands in the district. Such concerns as the United States Steel Corporation and the Lake Superior Corporation do not place great confidence in Hunter's Island prospects, and both these have carried on explorations there in previous years.

Shipments from the Michipicoten range, Helen mine, have ceased for the year, and have been as follows since the beginning of mine operations there, four years ago:

	Gross tons.
1900	64,135
1901	231,035
1902	295,399
1903	201,387
1904	117,153
Total	909,106

The shipments of this year show a great decrease on account of the lateness of beginning and the troubles in which the company was involved for so much of the season. For the past few weeks of the shipping season the company has been moving about 1000 tons a day. It is one of the peculiar facts connected with the iron ore trade of 1904 that the company was able to sell in the open market a non-Bessemer ore, containing a trifling percentage of sulphur, at a better price than it paid for a strictly good Mesaba of about equivalent iron content.

Copper Figures.

The November copper outturn for Lake mines was 19,000,000 pounds, or at the rate of 225,000,000 pounds per year. This is of course much better than the Lake will show for the 12 months, and is about a maximum for the remainder of the winter. The Lake goes into winter with all smelters and mines cleaned of copper and mineral.

D. E. W.

National Metal Trades Association Notes.

CINCINNATI, OHIO, December 12, 1904.—The Cincinnati Metal Trades Association held a foremen's meeting on last Thursday evening, which was very generally attended. Papers were read by Charles W. Conklin, chemist of the Lunkenheimer Company, on "Relations of Chemical and Physical Tests as Applied to Metal Trades"; T. A. Sperry, of the Cincinnati Milling Machine Company, on "Feeds and Speeds," and C. R. Reno, of the Triumph Electric Company, on "Variable Speed Motor Appliances." A general discussion was had, and a very profitable evening spent.

The Manufacturers' Association of Pittsburgh reports a great improvement in business. Its records show that the employed men exceed the discharged men by 106.2 per cent.

The Worcester Labor Bureau has issued a bulletin relative to the proposed new Uniform Bill of Lading, from which we make the following excerpt: "The matter of a new Uniform Bill of Lading, which goes into effect January 1, was brought to the attention of the Executive Council through the Illinois Manufacturers' Association. Inasmuch as this bill is going to be more of a hardship to the manufacturers and shippers, and the railroads are to be held less responsible in the preservation and care of freight, it is suggested that a protest should be made by this association and by every shipper against the adoption of this new bill.

"1. Protest because a rate of 20 per cent. in advance of the published rate is demanded if the shipper elects to ship his commodities subject to the common law liability of the carrier.

"2. Protest because you are required by signature to assent to onerous conditions of shipment which have not heretofore been enforced.

"3. Protest because a uniform bill of lading is not negotiable.

"4. Protest because a shipper is compelled to bind himself and his assigns to several conditions which operate largely to exempt the carrier from his common law liability."

The regular monthly meeting of the New York Metal Trades Association was held December 8 and was well attended. Several new names were secured for membership, and the association is reported to be in a flourishing condition. W. P. Eagen, commissioner, was present and addressed the meeting on "Industrial Conditions." The next meeting will be held on Thursday, January 12, at which time there will be an election of officers to serve for the ensuing year.

New Publications.

Scientific American Reference Book.—Compiled by Albert A. Hopkins and A. Russell Bond. Published by Munn & Co., *Scientific American* offices, New York. Pages, 516. Copiously illustrated, among the illustrations being six colored plates. Cloth. Price, $1.50 per copy.

This book is the result of the queries of three generations of readers and correspondents of the *Scientific American* and deals with matters of interest to everybody. The information given covers a very wide range of subjects, and in many cases treats of matters which cannot readily be found in any available reference or text-book. It is offered as a book for every day reference, classing in the same category as an encyclopedia. While the subjects treated are usually handled tersely, in some cases whole chapters are given to matters deemed worthy of special consideration. The chapter relating to patents, trade-marks and copyrights is a thorough one, aiming to give inventors proper legal aid. The chapter on manufactures deals with most interesting figures, admirably presented for reference. The chapter dealing with mechanical movements contains nearly 300 illustrations. Weights and measures occupy a considerable section of the book. As a work of reference for business men it will be found of very high value.

The Architects' Directory and Specification Index.—Edition of 1904-1905. Published by William T. Comstock, publisher of *Architects' and Builders' Magazine*, 23 Warren street, New York. Pages, 160. Cloth. Price, $2 per copy.

This is the sixth edition of this directory and contains several new features. It comprises as usual a complete list of architects in the United States and Canada, a list of architectural societies and a specification index of manufacturers of and dealers in building materials. The additions made this year consist of a list of landscape architects, a list of naval architects and a new schedule of charges of the American Institute of Architects. These additions make the work cover the whole architectural field.

It is said that the Southern Pacific Railroad Company has found that the 90-pound German steel rails laid on the Shasta Division of the Colorado & California branch last year are greatly inferior to American rails of the same weight. The steel is softer, and on the sharp curves of the Sacramento Canyon many of these rails are so badly worn that they will soon have to be replaced. In fact the German rails have not worn as well as American rails of lighter weight.

The Westinghouse Electric & Mfg. Company, through its agents, G. & O. Braniff & Co., Mexico, has been awarded the contract for all the electrical apparatus to be installed by the El Oro Mining & Railway Company, El Oro, Mexico. This contract amounts to nearly $100,000.

MANUFACTURING.

Iron and Steel.

It is announced that the Canton rolling mill, at Canton, Ohio, will resume operations January 1 with a full force of between 300 and 400 men. The plant has been idle about three years, having been shut down soon after its purchase by the American Sheet Steel Company.

The Midland plant of the American Sheet Steel Company, at Muncie, Ind., is being put in condition to operate again after a shut down for a year and a half, owing mainly to the exhaustion of natural gas. The mill was the leading one in the West, giving employment to 600 men. The furnaces, except those for annealing, are being changed to use coal instead of gas. Mark McDonough is superintendent.

The Indiana Rolling Mill Company, Newcastle, Ind., has secured control of the harrow disk department of the Chicago Steel Company, whose plant was recently burned at Newcastle. The plant of the rolling mill company will be enlarged to provide for the new department.

After an extended idleness one of the furnaces of the Sheffield Coal & Iron Company, at Sheffield, Ala., has been successfully blown in.

The Princess Furnace, Glen Wilton, Va., blew in November 2.

The Wellston Iron & Steel Company, Wellston, Ohio, blew in one of its stacks on December 1.

The Embree Iron Company, Embreeville, Tenn., expects to blow in its furnace during January, 1905.

The 12-inch mill at the Upper Union mills of the Carnegie Steel Company, Youngstown, Ohio, was put on double turn last week. All traces of the recent strike at this plant have about disappeared, and the mills are in operation to practically full capacity. It is probable the strike will be officially declared off by the Amalgamated Association within a short time.

The Canton Works of the American Sheet & Tin Plate Company at Canton, Ohio, containing five sheet mills and two cold mills, and which has been idle for a long time, will probably be started this week. The annual capacity of this plant is 16,250 net tons of black sheets.

The plant of the Youngstown Mfg. Company, Youngstown, Ohio, manufacturers of nuts and bolts, and which has been idle for some time, will be started up very shortly after January 1.

General Machinery.

The Hutchinson Concrete Company, Hutchinson, Kan., is erecting a 50 x 50 foot addition to its machine shop. The cement plant proper is equipped with a Normandin machine.

The St. Louis Well Machine & Tool Company, St. Louis, Mo., reports that three of the five outfits which formed part of its exhibit at the World's Fair have already been sold.

The Cincinnati, Hamilton & Dayton Railroad shops at Indianapolis (formerly the Indianapolis, Decatur & Western) will be enlarged so as to give employment to 200 more men. James B. Conaty is master mechanic.

The Erie Railway Company is making numerous improvements at its shops at Galion, Ohio, and will install about $30,000 worth of new machinery, much of which has been ordered.

The Aultman & Taylor Machinery Company, Mansfield, Ohio, is erecting an addition to its plant. The building will be 111 x 191 feet, three stories high, and will be built of steel, brick and tile, so as to be practically fire proof. It will be used as a warehouse, replacing the building which was destroyed by fire some time ago.

The Louden Machinery Company, Fairfield, Iowa, has just completed a substantial fire proof warehouse and office building at St. Paul, 50 x 100 feet, two stories and basement. It is located on the Minnesota Transfer line serving all roads entering St. Paul and Minneapolis, and is provided with modern means for loading and unloading goods with the minimum cost of handling. The company also announces that its malleable iron plant at Fairfield, which was recently completed, is now turning out a superior grade of malleable castings.

The Keystone Driller Company, Beaver Falls, Pa., is just completing a new boiler house, in which will be concentrated all the steam power used in the plant, doing away with other power stations. The firm is very busy, having a large number of orders on its books, including three complete well drilling outfits to be shipped to South Africa and South America.

The Norton Grinding Company, Worcester, Mass., is running with two shifts, night and day, because of the large number of orders on hand for the company's grinding machines. Many of the orders are from foreign customers. This is the first time in the company's history that it has been necessary to work beyond the normal ten hours a day.

The Scott & Sons Company has been organized at Medford, Mass., with a capital stock of $50,000, for the manufacture of automatic revolving chucks, collapsing taps, expanding dies and turret lathes. The officers are Harry Dutton, president; Alexander MacGregor, treasurer, and Gordon Scott, clerk.

The Brown Corliss Engine Company, Corliss, Wis., is now extending its foundry 60 feet, which has been found necessary to take care of the large amount of work on hand and in view. The company is in a position to manufacture the largest type of engines, pumps, &c., as demonstrated by the award to it of a contract by the city of Milwaukee for a triple expansion high duty crank and fly wheel 20,000,000-gallon pumping engine.

The Davenport Locomotive Works, Davenport, Iowa, has purchased from the Rockingham Building Company for the consideration of $56,000 the property on which its plant is located. The Davenport Company recently increased its capital stock to $200,000.

The Troy Laundry Machinery Company, Chicago, has leased land 124 x 264 feet at La Salle and Twenty-third streets, and will immediately erect thereon a five-story brick mill construction factory. The construction will be unusually heavy, and floors will be built to withstand loads of 400 pounds to the square foot, 25-foot spans. The main plant of the company is at Troy, N. Y. Power equipment and other machinery will be required. Jenney & Mundie, Chicago, are the architects.

The J. I. Case Threshing Machine Company, Racine, Wis., is preparing to enter the market as a large producer of road rollers. An experimental machine has already been built and the company contemplates the manufacture of a large number for the coming season.

The two plants of the American Clay Working Company, one located at Willoughby, Ohio, and the other at Bucyrus, Ohio, were sold at receiver's sale December 8, to the bankers' reorganization committee, representing the creditors, for $350,000. The plants will be operated by a new company, to be known as the American Clay Machinery Company, and there will be practically no change in the management. The new concern is capitalized at $500,000.

The L. & I. J. White Company, manufacturer of machine knives and edge tools, Buffalo, N. Y., is erecting a large addition, 80 x 135 feet in size, to its forge department, and will equip it with up to date appliances. The addition is rendered necessary by the rapid increase of the business. The company has also added quite largely to its machinery equipment during the past few months, both in the iron machine and wood machine departments. In connection with the new building railroad tracks and switching facilities are being provided.

The Philadelphia Iron Works, Philadelphia, Pa., will probably make considerable additional changes in its plant in the spring. Some of the contracts for the immediate requirements in the way of machinery have been let, among which is one for an electric traveling crane to the Niles-Bement-Pond Company, New York. An order has also been placed for a 12-foot reach hydro-pneumatic riveter of the improved Caskey type.

The improvements under way at the plant of the Geiser Mfg. Company, Waynesboro, Pa., include the erection of a new erecting shop 70 x 220 feet and a blacksmith shop 70 x 102 feet. To these will be added two other buildings, one 30 x 150 and the other 50 x 110 feet, also a shed 50 x 70 feet. At its works in Greencastle, Pa., which the company recently acquired for the production of gas engines and pumps, a new foundry 100 x 150 feet is being constructed.

The Fulton Foundry & Machine Works, Atlanta, Ga., makers of castings and special machinery, are having plans prepared for a new plant, which will be completed in February. It will include two steel and brick buildings, each 120 x 300 feet, which will be equipped with electric traveling cranes and other modern machinery. Will L. Hancock is general manager.

The Westinghouse Electric & Mfg. Company, Pittsburgh, Pa., has furnished a very large amount of electrical equipment for the new tube mill being erected by the National Tube Company at Lorain, Ohio.

The Backmann Engineering Company has been organized at Youngstown, Ohio, to engage in the manufacture of standard and special machinery used in the manufacture of rubber goods. The capital stock is $10,000. Charles B. Backmann is president. Horace T. Smith secretary and treasurer, and Carl Hildebrand will be active in the management.

The Woolson & Deck Company, 26 Cortlandt street, New York, recently incorporated, represents the Murphy Iron Works, Detroit, Mich., and will handle complete lines of Murphy automatic smokeless furnaces. Special furnaces for burning soft coal will be built by the company. The principal product will be the Woolson antifriction gates for handling pulverized and granular material and bagging it free of dust. A plant for the manufacture of the Woolson machine will be established in Newark, N. J. The company, which is composed of Orosco C. Woolson and Howard S. Deck, will also do a general consulting and engineering business.

Power Plant Equipment.

The Ada Electric & Gas Company, Belleville, Ill., has been incorporated with $100,000 capital stock, to furnish heat, light and power and to manufacture ice. The incorporators are J. A. Hamilton, A. B. Daab and L. D. Turner, Jr.

J. H. McConnell of Marietta, Ohio, is fitting up a factory in that place for the manufacture of a line of steam specialties, chief among them being a patent steam separator and trap.

The Cleveland State Hospital, A. B. Howard, secretary, Cleveland, will receive bids until December 20 for furnishing and installing one 175 horse-power engine, one 100-kw. generator and five-panel switchboard in the power house of the Cleveland State Hospital.

The Kelly-Plough Gasoline Locomotive Company, Limited, Spokane, Wash., has been incorporated with $80,000 capital stock, to build and sell gasoline locomotives. The company states that it owns patents covering a new type of gasoline locomotive that can be immediately changed to a stationary engine, and which is peculiarly adapted to replace horse propelled tramways in timber, quarry, mining and construction work. M. H. Kelly is president; F. T. Larrabee, vice-president, and E. E. Plough, secretary and treasurer.

The Black Hawk Electric Company, Davenport, Iowa, has recently secured the contract to install a complete municipal electric lighting plant, including all equipment and involving an outlay of about $20,000, at Syrcey, Ark. A similar contract which the company has for execution at Ottumwa, Iowa, is well under way and will be completed within two weeks.

Col. J. C. Bonner, J. G. Hallepieus and others of Toledo are at the head of a company formed to develop a water power in New Mexico. The company expects to furnish electric light to Los Vegas, Santa Fé and Albuquerque. Work on the plant is to begin in the near future.

Foundries.

The Heindel Foundry Company, Hanover, Pa., recently organized, will manufacture iron, brass and other metal castings. It is now putting up a brick building 50 x 100 feet, and expects to commence running on January 1.

The Globe Foundry Company, recently organized with a capital stock of $40,000, has leased the old Bent Foundry in Port Chester, N. Y., which it will operate for the manufacture of castings. Considerable new equipment will be installed, with the expectation of having the foundry fully equipped to commence business by the first of the year. John F. Mills is president; John M. Heatherton, vice-president, and Herman L. Marshall, secretary and treasurer.

The American Steel Foundries resumed operations at its East St. Louis (Ill.) plant November 28, after being idle about a year because of labor difficulties. It is said that the labor troubles were never settled by agreement and that many foremen and skilled workmen were taken to East St. Louis from the company's plant at Granite City. There are employed on the day shift about 2000 men. Later it is expected to supplement this number of employees with a night force numbering about 1000 men.

Some improvements are to be made to the Powers Foundry at Elkton, Md.

The Reeves Foundry Company, Trenton, N. J., has purchased most of the equipment for its new foundry. The company is at present considering the core oven equipment.

Fires.

A fire at the lumber yards of Robinson & Co., Portsmouth, Va., destroyed the sash and blind factory and the power house.

The Roby Building, Rochester, N. Y., which was occupied by the Van Bergh Silver Plate Company and the Hayden Furniture Company, was destroyed by fire December 11. The losses amount to over $100,000.

The factory of the Henry H. Sheip Mfg. Company, Philadelphia, Pa., maker of cigar boxes, was damaged $150,000 by fire on December 10.

The factory of the Pontiac Shoe Mfg. Company, Pontiac, Ill., was recently destroyed by fire. The loss is about $75,000.

Bridges and Buildings.

The Brackett Bridge Company, Cincinnati, Ohio, of which H. G. Tyrrell is chief engineer, is manufacturing the new highway bridge to be constructed by Hamilton County, Ohio, across the Miami River at Elizabethtown, Ohio. This bridge is said to be the longest simple truss span in the world, it having a length of 586 feet from center to center of end pins.

The Forest City Steel & Iron Company, Cleveland, Ohio, is shipping to Knoxville, Tenn., a large amount of structural material for a power plant for the Knoxville Traction Company. Two buildings, each about 200 feet long, are being erected.

The city of Cleveland is preparing to erect a steel bridge over the railroad tracks connecting Erie street with the Erie street extension. New docks are to be erected and passenger steamers will land there next summer. The bridge will cost about $100,000.

Hardware.

The Geuder & Paeschke Mfg. Company, maker of pieced, stamped and japanned tinware and the like, Milwaukee, Wis., is putting up an addition to its warehouse which is four stories in hight and approximately 65 x 140 feet. The cost of this addition will be about $30,000 and in design it will correspond with the balance of the plant.

The R. & C. Indicator Company, 71 to 75 Wood avenue, Bridgeport, Conn., has been incorporated to manufacture the R. & C. magnetic liquid indicator, a device for indicating the amount of liquid in a gasoline tank, and also a pneumatic hand pump for inflating automobile tires.

The Imperial Enameling & Stampings Company has been formed at Barnesville, Ohio, and it is the intention to erect a plant for the production of stampings and enameled ware. The capital stock is $75,000. J. S. Harrison, J. W. Bradfield, F. L. Harrison and G. L. Harrison are at the head of the company.

The Colt's Patent Fire Arms Mfg. Company, Hartford, Conn., is erecting a fire proof storehouse for finished goods, models and standards, to be 46 x 60 feet and three stories.

The Crescent Arms Company, Norwich, Conn., has reorganized its board of officers to fill the vacancy caused by the death of Frank A. Foster, who was the general manager. H. H. Gallup remains president of the corporation, J. C. Henderson is secretary and general manager, E. M. Lester treasurer, and H. B. Foster superintendent.

Theo. J. Ely Mfg. Company, Girard, Pa., manufacturer of a line of hardware specialties, has added 1000 square feet of floor space to its factory on account of increased pressure of business. Several new improved machines have also been installed, which have enabled the company to materially increase its capacity. A complete line of waffle irons has been added to the product, adapted both to coal and wood ranges and gas stoves. A number of new articles are now being made ready for the market and will be offered to the trade January 1.

The H. J. Gurner Company has been established at Niagara Falls, N. Y., for the manufacture of the Gurner ice cream freezer. The new factory of the company is located on the tracks of the New York Central Railroad at Sugar street.

Miscellaneous.

The Summit Stove Company, Akron, Ohio, has been formed by Frank Fiebeger, C. I. Bruner, Hiram J. Howe and others. The company has acquired the old Sieberling plant on East Mill street and will manufacture a new line of stoves.

The Champion Steel Range Company of Cleveland has had plans prepared by the Corlett Engineering Company, Cleveland, for a new plant to be located on the flats near South Brooklyn, Ohio. The main building will be 84 x 208 feet and two stories high, and this, with a boiler house, will be erected immediately.

Thomas F. Kelly of Galion, Ohio, is at the head of the company being formed for the manufacture of a patent sheet steel vault for burial caskets. A factory will be established at Galion.

The Cleveland Electric Railway Company, Cleveland, Ohio, has placed a contract with the General Fire Extinguisher Company of Providence, R. I., for equipping its repair shops and one of its car houses with a new form of sprinkler system recently brought out by this company. The company has also placed a contract with the National Electric Company, Milwaukee, for 700 air brake equipments with which to equip all its cars.

The Semi Steel Company, Cleveland, has within the past few months equipped plants in all parts of the country for the manufacture of sand lime bricks. The total capacity of these plants is 200,000,000 bricks per annum. The bricks are made of ordinary sand, with a small percentage of lime added, and it is claimed that they will stand a crushing strain of nearly five times that of clay bricks.

The Dayton Motor Car Company, Dayton, Ohio, has acquired the motor vehicle department of the Stoddard Mfg. Company of that city. A portion of the Stoddard plant has been leased and is being fitted up with special tools and machinery for the production of gasoline automobiles.

The San Pedro, Los Angeles & Salt Lake Railroad Company has placed orders for 750 100,000-pound box cars, 200 80,000-pound stock cars and 750 all steel 100,000-pound gondola coal cars.

The Southern Ohio Brick & Tile Company, Portsmouth, Ohio, has been incorporated with $75,000 capital stock. Marvin Clark, A. T. Holcomb, E. H. Clare, M. H. Shummy and T. J. Morgan are interested. They will erect a large brick and tile plant in Scioto County, Ohio.

James L. Barnett, Indianapolis, has been appointed receiver of the Capital Automobile Company of that city. The company was organized in December, 1903.

The Lebanon-Thornton Traction Company has been organized and incorporated with a capital stock of $150,000 by Frank M. Reed, H. M. Atkinson, Robert P. Woods, Indianapolis; A. C. Daily, Empson T. Lane, S. M. Ralston, Richard Neptune, Lebanon, Ind.; W. C. Jacques, R. E. Niven, L. C. Riley, R. S. Stall, W. C. Burk, Wm. Emmons, W. O. McKern and Ezekiel R. Jacques, Thorntown, Ind.

The Snell Motor Car & Truck Company, Toledo, has changed its name to the American Motor Truck Company. Samuel Snell has severed his connection with the company. It is manufacturing heavy automobile trucks and will make a demonstration of its car in the near future.

The Waterville Cement & Fence Post Company, Waterville, Ohio, is preparing to market a reinforced concrete post designed for supporting wire fencing along railroad rights of way. It is claimed it will last much longer than wood and will not burn.

The Trenton Oil Cloth & Linoleum Company, Trenton, N. J., is rebuilding the part of its plant which was recently destroyed by fire. It is probable that no new machinery will be required, as the old machines are now being repaired in that city.

The Iron and Metal Trades

On Saturday the Steel Rail manufacturers decided to open their books for 1905 delivery at $28 per ton at mill for Standard Sections, and to fix a minimum at which Angle Bars be sold. Thus far comparatively few orders have been placed with the Eastern mills, but it is understood that the Western mills have entered about 150,000 tons. The Tennessee Company, one of the independent producers, with a capacity of about 150,000 to 175,000 tons annually, is carrying over a considerable volume of orders from this year, and has booked new business which will employ the mill to the middle of the next year. An order for 75,000 tons from a Southern road now in the market, the bulk of which will probably go to this mill, will insure full employment for the whole of the year 1905.

The Steel Rail manufacturers, after a very careful and close study of the situation, have come to the conclusion that the tonnage which will come to them in 1905 will be very large and will furnish very much better employment than this year, which was far below the average.

There has been some disposition to regard the purchases of Pig Iron by the leading interest as an effort to manipulate the market. The fact is that the metal was needed for immediate use, so far as the Western purchases are concerned, and that in the East the company is practically dependent upon the open market. It is understood, too, that additional quantities will be purchased at an early date, for the Central West, for January and February delivery.

The Carnegie Steel Company purchased last week 25,000 tons of Bessemer Pig for December delivery at $15.50 at Valley furnace, this following the buying of close upon 20,000 tons of Basic Pig at about $15 at furnace, for Eastern Pennsylvania and New England delivery, referred to last week.

In the Foundry Iron trade the markets have been quieter after the heavy buying of the past month or more. A large Cast Iron Pipe interest has purchased 15,000 tons of Virginia Iron.

The Eastern trade is beginning to watch for possibilities of importation of Foreign Foundry Pig, but as yet there are no chances, the market abroad having risen. It is possible, however, that some Soft Iron may come into New England, aside, of course, from importations under drawback.

During the week a lot of 6000 tons of Foreign Spiegeleisen has been taken by an Eastern steel plant. There has been quite a large business during the past few weeks in Foreign Ferromanganese, and prices have advanced.

Among the larger Structural contracts placed is one lot of about 9000 tons of Shapes and Plates for the Boston Elevated, for which the material will be furnished by the Lackawanna mill, with some round lots coming up, among them one block of 8000 tons in Chicago. The leading interest booked 40,000 tons during November, a great deal of it in small lots.

In the lighter finished branches there has been another advance of $1 per ton in Wire products and an advance of $2 per ton on Galvanized Sheets. Premiums are being occasionally paid on Tin Plate, and continue in Bars.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	Dec. 14, 1904.	Dec. 7, 1904.	Nov. 16, 1904.	Dec. 16, 1903.
PIG IRON:				
Foundry Pig No. 2, Standard, Philadelphia	**$17.00**	$16.50	$16.25	$15.00
Foundry Pig No. 2, Southern, Cincinnati	**15.75**	15.75	15.25	12.25
Foundry Pig No. 2, Local, Chicago	**16.50**	16.50	16.00	14.50
Bessemer Pig, Pittsburgh	**16.85**	16.35	15.35	14.35
Gray Forge, Pittsburgh	**15.85**	15.85	14.35	13.00
Lake Superior Charcoal, Chicago	**17.50**	17.50	16.50	16.50
BILLETS, RAILS, &c.:				
Steel Billets, Pittsburgh	21.00	21.00	21.00	23.00
Steel Billets, Philadelphia	**25.00**	25.00	23.50	24.50
Steel Billets, Chicago	24.00	24.00	24.00	24.00
Wire Rods, Pittsburgh	**30.00**	31.00	27.00	31.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00
OLD MATERIAL:				
O. Steel Rails, Chicago	**15.50**	14.50	14.50	10.75
O. Steel Rails, Philadelphia	**16.00**	16.50	14.75	11.50
O. Iron Rails, Chicago	**22.00**	22.00	19.50	13.00
O. Iron Rails, Philadelphia	**20.50**	20.50	17.50	16.00
O. Car Wheels, Chicago	**16.50**	16.00	14.50	13.00
O. Car Wheels, Philadelphia	**14.50**	14.50	14.00	12.75
Heavy Steel Scrap, Pittsburgh	**16.00**	16.00	14.50	11.00
Heavy Steel Scrap, Chicago	**14.25**	14.00	13.00	9.00
FINISHED IRON AND STEEL:				
Refined Iron Bars, Philadelphia	**1.63½**	1.53½	1.50	1.35
Common Iron Bars, Chicago	**1.65**	1.65	1.45	1.35
Common Iron Bars, Pittsburgh	**1.54½**	1.54½	1.44½	1.34¾
Steel Bars, Tidewater	1.44½	1.44½	1.44½	1.44½
Steel Bars, Pittsburgh	1.30	1.30	1.30	1.30
Tank Plates, Tidewater	1.54½	1.54½	1.54½	1.78
Tank Plates, Pittsburgh	1.40	1.40	1.40	1.60
Beams, Tidewater	1.54½	1.54½	1.54½	1.73½
Beams, Pittsburgh	1.40	1.40	1.40	1.60
Angles, Tidewater	1.54½	1.54½	1.54½	1.73½
Angles, Pittsburgh	1.40	1.40	1.40	1.60
Skelp, Grooved Steel, Pittsburgh	1.40	1.40	1.40	1.40
Skelp, Sheared Steel, Pittsburgh	1.50	1.50	1.50	1.50
Sheets, No. 27, Pittsburgh	2.10	2.10	2.10	2.25
Barb Wire, f.o.b. Pittsburgh	**2.20**	2.15	2.05	2.45
Wire Nails, f.o.b. Pittsburgh	**1.75**	1.70	1.60	1.85
Cut Nails, Mill	**1.75**	1.70	1.60	1.90
METALS:				
Copper, New York	**14.87½**	14.87½	14.50	12.37½
Spelter, St. Louis	**5.70**	5.70	5.35	4.50
Lead, New York	4.60	4.60	4.60	4.25
Lead, St. Louis	**4.55**	4.52½	4.40	4.15
Tin, New York	**29.10**	29.12½	29.00	27.75
Antimony, Hallett, New York	**9.00**	9.00	8.00	6.25
Nickel, New York	40.00	40.00	40.00	40.00
Tin Plate, Domestic, Bessemer, 100 pounds, New York	3.64	3.64	3.64	3.75

Chicago.

FISHER BUILDING, December 14, 1904.—(*By Telegraph.*)

The most prominent topic of conversation in the Iron and Steel market is, of course, the reaffirmation of Standard Rail prices at $28 in 500-ton lots. This was expected, but the abolition of the practice of equalizing freights is a surprise. Scarcely less interesting is the purchase last week of a large tonnage of Pig Iron by the United States Steel Corporation through the Bessemer Association. It is widely believed that this purchase at the price paid was made by the leading interest to support the market. Be that as it may, Iron is stronger than ever, with some actual advances.

Plates, Structural Steel and Bars are waiting for the meeting of December 20, at which time advances are expected ranging from $2 a ton on Bars to $4 on the heavier materials. Sheets are stronger and Galvanized Sheets are $2 higher than last week. The Inland Steel Company's mill at Indiana Harbor is still idle, but if prices advance $2 or $3 a ton there is a prospect of the mill starting shortly after such advances. There is no change in the situation on Pipe and Boiler Tubes. Cast Pipe has advanced another dollar. Old Materials, thanks to a general snowfall from the Atlantic to the Rockies, have advanced from 50c. to $1.50 a ton, and the weakness that developed a few days ago has been counteracted, both by weather conditions and the new strength in Pig Iron. It will require another week to determine whether the recent snowfall in the Coke regions

will relieve the water famine or make matters worse by tying up transportation. Metals are steady in spite of the Wall Street flurries. The whole Wire list is $1 a ton higher than last week's report, and still higher prices are threatened.

Pig Iron.—By this time the trade has become very generally apprised of the fact that the United States Steel Corporation made large purchases of Bessemer Iron in the Valleys last week, and the prices that were paid by the corporation for this Iron have tended to strengthen the whole Iron market. This purchase came, whether accidentally or by design, at the psychological moment when a prop was needed to support a market that had advanced too rapidly to be maintained, and it had the desired effect in strengthening prices on all Pig Iron, while it made actual increases on only a few numbers in the list. The sentiment now seems to prevail in the West that the maximum producing capacity of blast furnaces—say, about 20,000,000 tons a year—will be fully taxed to supply the actual consumptive demand for the first half of 1905 at least; beyond the limits of July 1 the prophets fear to tread. As against this optimistic view there must be recorded a stern present day reality to the effect that the consumptive demand is but little above normal and rather less than had been hoped for some weeks ago. It is true that railroads are buying in larger and larger tonnages of Iron and Steel requirements of every class, from Rails to Nails, and that general business conditions have improved to a gratifying degree as compared with the famine prices of 1904 midsummer. Northern Irons remain, for the time being, unchanged, as compared with last week, but the tone is decidedly firmer, and it looks as if the day of $16.50 Iron is about past. Southern Irons are still held firm at $13.50, Birmingham, with some sales being made at a higher price and some about 25 cents lower, the lower sales being those of Irons that are accustomed to giving at least 25c. advantage because of their high phosphorus or other undesirable constituents. About the only changes made in the following prices are those of Irons based on Shenango and Mahoning Valley figures:

Lake Superior Charcoal	$17.50 to $18.00
Northern Coke Foundry, No. 1	17.00 to 17.50
Northern Coke Foundry, No. 2	16.50 to 17.00
Northern Coke Foundry, No. 3	16.00 to 16.50
Northern Scotch, No. 1	17.50 to 18.00
Ohio Strong Softeners, No. 1	18.80 to 19.30
Ohio Strong Softeners, No. 2	18.30 to 18.80
Southern Silvery, 4 to 6 per cent. Silicon	18.15 to 19.15
Southern Coke, No. 1	.... to 17.65
Southern Coke, No. 2	.... to 17.15
Southern Coke, No. 3	.... to 16.65
Southern Coke, No. 4	.... to 16.40
Southern Coke, No. 1 Soft	.... to 17.65
Southern Coke, No. 2 Soft	.... to 17.15
Southern Gray Forge	.... to 16.15
Southern Mottled and White	.... to 15.90
Malleable Bessemer	16.50 to 17.00
Standard Bessemer	18.30 to 18.80
Jackson County and Kentucky Silvery, 6 to 8 per cent. Silicon	19.30 to 20.30
Jackson County and Kentucky Silvery, 10 per cent. Silicon	.... to 21.30
Alabama Basic	.... to 17.15
Virginia Basic	.... to 17.15

Old Materials.—The weakness of last week was only temporary. Fortunately for the hundreds of dealers with their hundreds of thousands of tons of Old Materials in stock, Pig Iron was given a new strength by the United States Steel purchase at a moment when a weakening was threatened, and this was followed by a very general snowfall extending from the Atlantic Coast to the Rocky Mountains, which buried, possibly for the balance of the winter, a large tonnage of Scrap, and thus withdrew it from the available market supply. Five inches of snow at Des Moines, 2 inches at Kansas City, 2 inches at St. Louis, 4 inches at Duluth, 8 inches at Milwaukee, 4 inches at Chicago, 3 inches at Cincinnati, and from 2 to 5 inches eastward from that point make a sufficient blanket to cover a supply of Scrap that might have been potent in dragging down present high prices, and the removal of which from the market will tend to make prices on Scrap materials rise steadily until a general thaw releases the accumulation on the various railroad rights of way. The Illinois Central and the Atchison, Topeka & Santa Fé both disposed of large lists of Scrap during the past week. The Santa Fé came in just before the stimulating influences made themselves felt, and therefore received somewhat lower prices than have ruled since. The Illinois Central was fortunate in securing practically the highest market prices. The Chesapeake & Ohio also disposed of a large tonnage at good prices. Present figures for Old Materials are about as below, the lower prices being those at which dealers have purchased and the higher at which they offer the items named:

Old Iron Rails	$22.00 to $22.50
Old Steel Rails, 4 feet and over	16.00 to 16.50
Old Steel Rails, less than 4 feet	15.50 to 16.00
Heavy Relaying Rails, subject to inspection	22.00 to 22.50
Heavy Relaying Rails, for side tracks	20.00 to 20.50
Old Car Wheels	16.50 to 17.00
Heavy Melting Steel Scrap	14.25 to 14.75
Frogs, Switches and Guards	14.25 to 14.75
Mixed Steel	10.00 to 10.50

The following quotations are per net ton:

Iron Fish Plates	$19.50 to $20.00
Iron Car Axles	22.50 to 23.00
Steel Car Axles	17.00 to 17.50
No. 1 Railroad Wrought	17.75 to 18.25
No. 2 Railroad Wrought	16.75 to 17.25
Shafting	17.50 to 18.00
No. 1 Dealers' Forge	14.00 to 14.50
Wrought Pipes and Flues	13.25 to 13.75
Iron Axle Turnings	12.00 to 12.50
Soft Steel Axle Turnings	12.00 to 12.50
Machine Shop Turnings	11.25 to 11.75
Cast Borings	8.50 to 9 00
Mixed Borings, &c	8.50 to 9.00
No. 1 Mill	9.50 to 10.00
Country Sheet	8.50 to 9.00
No. 1 Boilers, cut to Sheets and Rings	13.00 to 13.50
No. 1 Cast Scrap	14.25 to 14.75
Stove Plate and Light Cast Scrap	12.00 to 12.50
Railroad Malleable	13.75 to 14.25
Agricultural Malleable	12.50 to 13.00

Metals.—Copper is unchanged but strong, Casting being quoted at 15c. to 15¼c. and Lake at 15¼c. to 15½c. Pig Lead is held at 4.60c. for 50-ton lots, 4.65c. for car lots and 4⅞c. to 5c. for small lots. Pig Tin has slightly weakened in tone and is ½c. lower, quotations being 30½c. to 31c. Through error last week Spelter was quoted 1c. too low. The market has stiffened during the past week, Spelter now selling 10c. per lb. higher, the car lot price being 5.75c., with small lots selling at 6c. Sheet Zinc is unchanged at 6.65c., Chicago, in car lots of 600-lb. casks and ¼c. to ½c. higher for small lots. Although no change is noted in the price of Ingot Copper, Old Copper and Brass have fallen off in demand and prices are ¼c. per lb. lower. Other kinds of Old Metals are steady at last week's quotations. We quote: Copper Wire and Heavy, 13c.; Copper Bottoms, 12c.; Copper Clips, 12½c.; Red Brass, 11¼c.; Red Brass Borings, 10c.; Yellow Brass, Heavy, 8¾c.; Yellow Brass Borings, 7⅞c.; Light Brass, 7¼c.; Lead Pipe, 4.25c.; Tea Lead, 4.10c.; Zinc, 4½c.; Pewter, No. 1, 19½c.; Block Tin Pipe, 26c.

Coke.—It remains to be seen whether the heavy snowfall extending all through the Coke regions and westward therefrom will be a bull or a bear influence. If this snow melts and gives to the ovens a much needed water supply there is a possibility that prices may weaken a little. If it does not the obstructions which it offers to transportation will tend to make prices even higher than they now are. At this writing the forecast is for colder weather and for more snow, and as a consequence Coke prices are strong all through the West. The foundryman who can buy Connellsville Coke on the basis of $2.50, at the ovens, or $5.15, Chicago, is fortunate, because the ruling price seems to be about $5.40. On the other hand, there is a considerable supply of Coke offered by regions along the L. & N. which enjoy a $2.25 freight rate at about $4.75, Chicago. Milwaukee Solvay is being quoted at $5.50 for immediate delivery, and the Milwaukee ovens are understood to be so full of business that they are indifferent to a material increase in tonnage.

(By Mail.)

Billets.—The demand is good and there is a threatened shortage owing to the fact that so many producers of Billets are using practically their full output in their own finishing mills. Prices are unchanged and firm, as follows: Bessemer Rolling Billets, 16 square inches in section and larger, up to but not including 100 square inches, $24 per gross ton, Chicago; 100 square inches, up to but not including 400 square inches, $26; 400 square inches and larger, $30. Open Hearth Forging Billets, $26 a gross ton for sections 16 square inches, up to but including 100 square inches; Billets smaller than 16 square inches in section or 100 square inches and larger, $28; Axle Billets, $28. Less than car lots, $2 extra.

Rails and Track Supplies.—The announcement of the reaffirmation of the $28 price, which has been in vogue for so long, has elicited no surprise, as it was what was expected, but the new method of making delivered prices is a surprise to the trade generally. Freight rates are no longer equalized, and the $28 price is supposed to be quoted at mill by all members of the pool, with full freight to destination for delivered price. This will give the Illinois Steel Company a tremendous advantage in Western business. Large specifications are expected almost immediately from a number of Western roads, though the real buying movement is not expected to begin until after January 1. Light Rails have been advanced from $2 to $6 a ton, the lowest price for the heavier sections being at $24, at mill and figures ranging from there to $30, at mill, for the light sections. Angle Bars are unchanged at 1.30c. to 1.35c.; Spikes have advanced $1 a ton, being now quoted at 1.70c. to 1.75c.; Track Bolts are also higher, ranging from 2.30c. to 2.40c., base, with Square Nuts, and 10c. to 20c. extra for Hexagon Nuts. Store prices on Track Bolts, Angle Bars and Spikes are 15c. to 20c. higher than mill prices.

Structural Material.—A large deal is being figured on now that will require about 8000 tons of Structural Shapes, but details as to the name of the buyer and location of building are withheld. The settlement of the Rail ques-

tion is expected to result in a large tonnage of bridge orders from the railways. Current specifications on Structural Materials for bridges, buildings and for other purposes are improving nicely, being stimulated no doubt by the belief that the meeting of December 20 will result in an advance of prices. Official figures are unchanged, as follows: Beams and Channels, 3 to 15 inches, inclusive, 1.56½c., Chicago; Angles, 3 to 6 inches, ¼-inch and heavier, 1.56½c.; Angles, larger than 6 inches on one or both legs, 1.66½c.; Beams, larger than 15 inches, 1.66½c.; Zees, 3 inches and over, 1.56½c.; Tees, 3 inches and over, 1.61½c., with the usual extras for cutting to exact lengths, punching, coping, bending or other shop work. Store prices on Structural Materials are 1.80c. to 1.90c. for Angles, Beams, Channels and Zees, base sizes, with 1.90c. to 2c. for 18, 20 and 24 inch Beams; Tees, 1.85c to 1.95c. These prices are for either random lengths or cut to lengths.

Plates.—It is announced unofficially that the Illinois Steel Company has a sufficient tonnage of Plates on its books to keep its mill running well into the second quarter of next year. Specifications on Plate contracts generally are excellent, and a large number of buyers are rushing to cover with contracts extending up to next July at present prices. Official Plate prices are unchanged, as follows: Tank quality, ¼-inch and heavier, wider than 24 and up to 100 inches wide, carloads, Chicago, 1.56½c.; 3-16 inch, 1.66½c.; Nos. 7 and 8 gauge, 1.71½c.; No. 9, 1.81½c.; Tank quality, 24 inches wide and narrower, 10c. below these prices; Flange quality, any width up to 100 inches, 1.66½c.; Sketch Plates, in Tank quality, 1.66½c.; in Flange quality, 1.76½c. Store prices on Plates are as follows: Tank Plates, up to 100 inches wide, ¼-inch and heavier, 1.80c. to 1.90c.; 3-16 inch up to 72 inches wide, 1.90c. to 2c.; No. 8, up to 60 inches wide, and No. 10, up to 48 inches wide, 1.90c. to 2c.; lower gauges are quoted under the headings of Sheets. Beyond the base widths named extras from 10c. to 25c. per 100 lbs. are charged for wider widths; Flange quality is usually charged at 25c. extra.

Sheets.—Last week's advance of $2 a ton on Galvanized Sheets has not extended thus far to Black Sheets, but the price on the latter is very firm at last week's figures, as follows, Chicago, car lots from mill, on blue annealed and box annealed Sheets: Nos. 9 and 10, 1.76½c.; Nos. 11 and 12, 1.81½c.; Nos. 13 and 14, 1.86½c.; Nos. 15 and 16, 1.96½c.; Nos. 18 and 20, 2.11½c.; Nos. 22 and 24, 2.16½c.; Nos. 25 and 26, 2.21½c.; No. 27, 2.26½c.; No. 28, 2.36½c.; No. 29, 2.46½c.; No. 30, 2.56½c. Chicago store prices are firm, but there is no longer any agreement or community of interests between jobbers, each naming such prices as seem to fit the individual case in point. In some cases there is 15c. to 20c. spread between the minimum and maximum prices charged out of store. This spread is particularly noticeable on the light gauges. With this explanation we make the following quotations: Black Sheets, No. 10, 1.95c. to 2.05c.; No. 12, 2c. to 2.10c.; No. 14, 2.15c. to 2.25c.; No. 16, 2.25c. to 2.35c.; No. 18, 2.35c. to 2.45c.; No. 20, 2.40c. to 2.50c.; Nos. 22 and 24, 2.45c. to 2.60c.; No. 26, 2.50c. to 2.65c.; No. 27, 2.55c. to 2.70c.; No. 28, 2.70c to 285c. Galvanized Sheets were last week advanced $2 a ton, making the new prices in car lots, f.o.b. Chicago: No. 16, 2.61½c.; Nos. 18 and 20, 2.76½c.; Nos. 22 and 24, 2.91½c.; No. 26, 3.11½c.; No. 27, 3.31½c.; No. 28, 3.51½c. These prices range in discounts from 75 and 10 and 10 in the heavier gauges to 80 and 2½ in No. 28. Store discounts now range from 75 and 5 to 75 per cent.

Bars.—Iron Bars are quite strong at 1.65c., base, half extras, Chicago, in car lots. Soft Steel Bars are unchanged at 1.46½c., base, half extras, Chicago, but an advance of about $2 a ton is looked for at the meeting of December 20, and buyers are covering requirements as far into the future as mills will permit at present figures. Steel Hoops are unchanged at 1.55c. rates, full extras, Pittsburgh, or 1.71½c., Chicago, in car lots. Store prices on Iron Bars have advanced 10c. to 15c., and are now 1.85c. to 1.95c., base, full extras. Soft Steel Bars and Bands are unchanged at 1.60c. to 1.70c., base, half extras; Soft Steel Angles, Channels and Tees at 1.75c. to 1.80c., half extras; Soft Steel Hoops, 2c. to 2.10c. rates, full extras.

Merchant Steel.—Prices are unchanged at present, but higher schedules are looked for following the prospective advances in Soft Steel Bars, and there is a good buying movement in anticipation of these advances. Specifications on contracts are coming in satisfactorily. Indeed, some mills are almost swamped with business. Prices are unchanged as follows: Bessemer and Open Hearth Spring Steel to general trade, 1.85c. to 1.90c.; Smooth Finished Machinery Steel, 1.71½c. to 1.76½c.; Smooth Finished Tire, 1.66½c. to 1.71½c.; Flat Sleigh Shoe, 1.51½c. to 1.56½s.; Concave and Convex Sleigh Shoe, apparently unchanged at 1.66½c. to 1.71½c.; Cutter Shoe, apparently unchanged at 2.25c. to 2.30c.; Toe Calk Steel, 2.01½c. to 2.06½c.; Crucible Tool Steel, 6½c. to 8c.; special grades of Tool Steel, 13c. and up; Shafting at 52 per cent. in car lots and 47 per cent. in less than car lots; Railway Spring, carload lots, 1.66c. to 1.71½c., with reduction for larger quantities.

Merchant Pipe.—Prices are unchanged and specifications are active. While business is coming at a greater rate than it has at any time for more than a year mills are still able to keep up with the specifications. Discounts to consumers on car lots for shipment from mill, f.o.b. Chicago, are unchanged, as follows:

	Steel.		Iron.	
	Black. Per cent.	Galv. Per cent.	Black. Per cent.	Galv. Per cent.
⅛ to ¼ inch	67.35	51.35	65.35	49.35
⅜ to ½ inch	71.35	59.35	69.35	57.35
7 to 12 inches	70.35	55.35	68.85	53.35
Extra strong, plain ends, ⅛ to ⅜ inch	60.35	48.35	58.35	46.35
½ to 4 inches	67.35	55.35	65.35	53.35
4½ to 8 inches	63.35	51.35	61.35	49.35
Double extra strong, plain ends, ⅛ to 8 inches	56.35	45.35	54.35	43.35

Boiler Tubes.—Official less than car lot prices on Boiler Tubes are unchanged at the following figures:

	Steel.	Iron.	Seamless Steel.
1 to 1½ inches	44.35	41.35	52.35
1¾ to 2¼ inches	56.35	41.35	40.35
2½ inches	58.35	46.35	43.35
2¾ to 5 inches	64.35	53.35	up to 4 in. 50.85
6 to 13 inches	56.35	41.35	.....

Car lot prices are supposed to be two points higher discount, but as a matter of fact good Tubes are quoted right along in car lots, f.o.b. Chicago, at the following discounts:

	Steel.	Iron.	Seamless.
1 to 1½ inches	50	42	55
1¾ to 2¼ inches	62	45	48
2½ inches	64	50	49
2¾ to 5 inches	70	57½	52½

Furthermore, these prices are obtainable in less than car lots, the buyer paying in addition the differential between less than car lot and car lot freight tariff, amounting to 4½c. from Pittsburgh and less than that from mills nearer to Chicago. Store prices on Boiler Tubes are fairly well maintained:

	Steel.	Iron.	Seamless Steel.
1 to 1¼ inches	42½	37½	40
1¾ to 2¼ inches	52½	35	37½
2½ inches	55	37½	40
2¾ to 5 inches	62½	47½	47½
6 inches and larger	52½	..	..

Cast Iron Pipe.—Notwithstanding the greatly increased cost of Pig Iron and the fact that Pipe makers are among the largest purchasers at from $13 to $13.50, Birmingham, and from $15 to $15.50, Valley, Pipe has advanced only $2 a ton since the low prices of last summer, the second $1 advance just having been made. This makes present prices on Cast Iron Pipe in ordinary lots $28.50 a gross ton for 4-inch Water Pipe and $27.50 for 6-inch and larger, with $1 extra for Gas Pipe.

Philadelphia.

FORREST BUILDING, December 13, 1904.

Notwithstanding adverse influences outside of the Iron trade, the demand for Iron is remarkably strong. Buyers appear to have an insatiable appetite, and from the desire to get more Iron it might be supposed that they had been out of the market for a very long while past. As a matter of fact, they were supposed to be so well bought ahead that they would have very little interest in the market until well into January, but they are still taking good quantities at gradually advancing prices. This is difficult to explain, but all the same the fact remains as stated. Consumption does not appear to be increasing in proportion to the demand for Pig Iron, although it is probably true that Philadelphia and the adjacent territory are duller than most other districts. It sometimes happens that they are actively employed when others are dull, but in this instance it is the reverse of that; consequently reports of the Iron market must be of the same general character. Sales of Pig Iron, however, have been quite heavy to the outlying districts, such as in New England and New York State, as well as to interior points in Pennsylvania; so that furnaces are sold close up and in no position to accept more business without being oversold and in danger of being unable to make satisfactory deliveries. The conditions to which we have referred do not warrant as favorable reports as may be the case with other markets, but due regard to the interests of the trade at large require the exact truth from each district without reference to what other reports may be. It has been frequently noted of late, however, especially by those who have connections in other districts, that Philadelphia is at present the slowest market in the country; but Philadelphia does not feel at all hurt by the comparison, as in the long run it gets its full share of business. The immediate tendency, however, is toward improvement, although it is on conservative lines and less liable to setbacks than in the more speculative districts.

Pig Iron.—Prices are extremely strong, the outside prices of last week being the inside prices of to-day. Ordinarily $17.25 is quoted for No. 2 X Foundry, but there is no great supply at that figure, and in some cases $17.50 is

asked and paid. In view of the light supply sellers are careless whether buyers take Iron or not, and are therefore in no mood to sell for forward delivery even at their own prices, the idea being to let things settle down a little before making further engagements. If prices are going higher they are entitled to all the advance, as their books are full of low priced orders and they need something to give them a better average, while if any reaction is coming it would only dissatisfy buyers. The disposition, therefore, is to take as little business as possible, but when it is taken full quoted rates are insisted on. At this season there is usually a falling off in consumption and less disposition to place orders, but as yet this feature has not developed, and, from the appearance of things the holiday season will not have any material influence on the general situation. The output of Pig Iron is expected to be larger, however, but whether this will have any influence or not will depend on what the prospects in regard to consumption will be after tne turn of the year. At the moment this is a matter of speculation, but the impression is that 1905 will be a good year, although a good deal will depend upon how soon it will begin and the extent to which it will be carried. For the present prices for Philadelphia and nearby deliveries are firm at about the following figures:

No. 1 X Foundry	$17.75 to $18.00
No. 2 X Foundry	17.00 to 17.50
No. 2 Plain	16.25 to 16.50
Standard Gray Forge	15.75 to 16.25
Ordinary Gray Forge	15.25 to 15.50
Basic	15.75 to 16.00
Low Phosphorus	19.75 to 20.00

Steel.—There is a fairly strong market for Steel and sales are readily made at about $25, delivered, a shade more or less according to delivery, size of order, &c.

Muck Bars.—Prices are firm at $28.50 to $29, delivered; in some cases these figures are asked f.o.b. sellers' mills, but a good deal depends on quality of Bars, location of mill, &c.

Plates.—The demand for Plates is gradually improving; the only complaint now is that prices are too low. Prospects for a heavy demand during the coming year are of the most encouraging character, and it is fully expected that advanced prices will be announced before the end of the month. Meanwhile quotations are as follows:

	Carload. Cents.	Part carload. Cents.
Tank, Bridge and Boat Steel, rectangular Plates, 24 inches wide and under	1.43½	1.48½
Tank, Bridge and Boat Steel, over 24 inches wide	1.53½	1.58½
Flange or Boiler Steel	1.63½	1.68½
Marine, A. B. M. A. and Commercial Fire Box Steel	1.73½	1.78½
Still Bottom Steel	1.83½	1.88½
Locomotive Fire Box Steel	2.03½	2.08½

The above are base prices for ¼-inch and heavier. The following extras apply:

	Per 100
3-16-inch thick	80.10 pounds extra
Nos. 7 and 8 W. G.	.15 "
No. 9 W. G.	.25 "
Plates over 100 to 110 inches	.05 "
Plates over 110 to 115 inches	.10 "
Plates over 115 to 120 inches	.15 "
Plates over 120 to 125 inches	.25 "
Plates over 125 to 130 inches	.50 "
Plates over 130 inches	1.00 "
All sketches (excepting straight taper plates, varying not more than 4 inches in width at ends, narrowest end being not less than 30 inches)	.10 "
Complete Circles	.20 "

All the above f.o.b. Philadelphia.

Structural Material.—The demand is improving, and specifications are coming in better than for a long time past. Bridge work is likely to be very active during the coming year, besides which the miscellaneous demand is very satisfactory. Prices unchanged as follows: Beams, Channels and Angles, 1.53½c. to 1.65c., according to specifications, and small Angles, 1.50c. to 1.55c.

Bars.—Without any unusual activity the demand is very satisfactory and prices firm. The inside quotation for Refined Iron is 1.63½c., delivered, but some of the leading mills quote $1 per ton more, and are not anxious for business even at that figure, unless there is a distinct understanding in regard to dates for specifications. Steel Bars are nominally 1.43½c., but it is difficult to place orders at that price unless they are distinctly first class and for immediate specification.

Sheets.—There is a great deal of inquiry for Sheets, and a large business could be done if manufacturers would enter orders for deliveries during the spring and summer months. The disposition, however, is to confine business to the first quarter of 1905, unless under special circumstances.

Old Material.—Without being quotably lower, the tone of the market is easier than it was a week ago. Buyers are not bidding for Material in any quantity unless at lower figures, which holders are reluctant to meet, so that for the present it is something of a stand off on both sides. Bids and offers for deliveries in buyers' yards are about as follows:

No. 1 Steel Scrap	$16.00 to $16.50
Old Steel Axles	18.50 to 19.50
Old Iron Axles	23.50 to 24.00
Old Iron Rails	20.50 to 21.50
Old Car Wheels	14.50 to 15.00
Choice Scrap, R. R. No. 1 Wrought	19.00 to 19.50
No. 1 Yard Scrap	17.50 to 18.00
Machinery Scrap	15.00 to 15.50
Low Phosphorus Scrap	19.50 to 20.50
Wrought Iron Pipe	15.00 to 15.50
No. 1 Forge Fire Scrap	14.00 to 14.50
No. 2 Forge Fire Scrap, Ordinary	11.00 to 11.50
Wrought Turnings	12.50 to 13.00
Wrought Turnings, Choice Heavy	13.50 to 13.75
Cast Borings	9.75 to 10.25
Stove Plates	13.50 to 14.00

Janney, Steinmetz & Co., dealers in Aluminum and Steel makers' supplies, have removed their offices to the northwest corner of Fourth and Market streets, Philadelphia.

Cincinnati.

FIFTH AND MAIN STS., December 14, 1904.—(*By Telegraph.*)

Pig Iron.—The market continues to show considerable strength and to all appearances is holding firm. Reports indicate, however, that the inquiry is a shade less and the tonnage actually placed during the week somewhat more curtailed than was apparent a week or two since. Quite a fair inquiry has been manifest for Basic and Malleable grades, but the demand for Foundry Iron has been less active. The inquiry, generally speaking, has been for early delivery, which is possibly fortunate in most instances as all reports indicate that the furnaces are discouraging all attempts for securing second quarter's delivery. What sales were made during the week covered all grades and all kinds of Iron offering. Many of the larger Southern producers are endeavoring to hold the market at $13.50, Birmingham basis, and while a number of sales have actually been made on this basis there is considerable tonnage still to be had at $13. The same may be said as regards Northern Iron, and while there is a tendency to make $16, furnace, the ruling figure, there yet remains a large amount that can be secured for 50c. less per ton. Reports indicate that many of the Southern furnaces are compelled to in a measure restrict their operations owing to the difficulty in securing what Coke they need. This condition of affairs will probably grow worse rather than better, as freezing weather and snow storms are reported from the producing districts. One large consumer of Pittsburgh is said to be in the market for about 3500 tons of Gray Forge for December and January shipment. One of the leading Pipe companies is reported as having bought 1000 tons of Southern No. 2, paying $13.50, Birmingham. We understand that it is also in the market for as much as 10,000 tons for delivery during the first quarter. It is reported that Tuscaloosa Furnace, belonging to the Central Iron & Coal Company, has blown out for repairs. Freight rates from Hanging Rock district to Cincinnati, $1.15, and from Birmingham, $2.75. We quote, f.o.b. Cincinnati, as follows:

Southern Coke, No. 1	$16.25 to $16.75
Southern Coke, No. 2	15.75 to 16.25
Southern Coke, No. 3	15.25 to 15.75
Southern Coke, No. 4	14.75 to 15.25
Southern Coke, No. 1 Soft	16.25 to 16.75
Southern Coke, No. 2 Soft	15.75 to 16.25
Southern Coke, Gray Forge	14.50 to 15.00
Southern Coke, Mottled	14.25 to 14.75
Ohio Silvery, No. 1	18.15 to 18.65
Lake Superior Coke, No. 1	17.15 to 17.65
Lake Superior Coke, No. 2	16.65 to 17.15
Lake Superior Coke, No. 3	16.15 to 16.65
Car Wheel and Malleable Irons.	
Standard Southern Car Wheel	$17.75 to $18.25
Lake Superior Car Wheel and Malleable	17.00 to 17.50

Coke.—The market is strong and firm, with the Furnace grades scarce. Operators are having trouble in filling contracts owing to unfavorable weather conditions and a scarcity of cars. The best grades of Connellsville Coke are quoted at $2.50 to $2.75, ovens, for Foundry grades, and $2.10 to $2.35 for Furnace grades.

Plates and Bars.—There is considerable activity manifested, but it is less marked than a week or two ago. Prices to-day are unchanged, but it is anticipated they will move upward within the next week. We quote, f.o.b. Cincinnati, as follows: Iron Bars, in carload lots, 1.60c., with half extras; the same in smaller lots, 1.85c., with full extras; Steel Bars, in carload lots, 1.43c., with half extras; the same in smaller lots, 1.65c., with full extras; Base Angles, 1.53c., in carload lots; Beams and Channels, in carload lots, 1.53c.; Plates, ¼-inch and heavier, 1.53c., in carload lots; in smaller lots, 1.80c.; Sheets, 16-gauge, in carload lots, 2.05c.; smaller lots, 2.60c.; 14-gauge, in carload lots, 1.95c.; in smaller lots, 2.50c.; Steel Tire, ¾ x 3-16 and heavier, 1.63c., in carload lots.

Old Material.—Dealers say that an exceptionally large business is being done on all sides. The railroads have been unloading their surplus and a very heavy tonnage has been the result. As far as can be ascertained, there has been no change in prices. We quote dealers' prices, f.o.b. Cincin-

nati, as follows: No. 1 Railroad Wrought Scrap, $16 to $17 per net ton; No. 1 Cast Scrap, $13 to $14 per net ton; Iron Rails, $20 to $21 per gross ton; Steel Rails, rolling lengths, $14 to $15 per gross ton; Relaying Rails, $21 to $22 per gross ton; Iron Axles, $20 to $21 per net ton; Car Wheels, $14 to $15 per gross ton; Heavy Melting Scrap, $13 to $14 per gross ton; Low Phosphorus Scrap, $17 to $18 per gross ton.

Pittsburgh.

PARK BUILDING, December 14, 1904.--(*By Telegraph.*)

Pig Iron.—The active buying movement which has been a feature of the market for several months seems to have spent its force to some extent, and for the past week or two actual sales of Pig Iron in this district have been light. In spite of this the market is strong, Bessemer and Basic Iron for first quarter delivery being held at $16, Valley furnace, or $16.85, Pittsburgh. The Pig Iron producers are insisting that dealers carry out contracts to the letter, and during the past week there have been sales of Bessmer Iron by dealers to consumers at prices considerably under the regular market, but only on Pig Iron that had to be moved this month, and for which dealers were unable to furnish shipping directions. The American Car & Foundry Company has bought 1500 tons of Malleable Bessemer Iron for its Detroit works and is in the market for a considerable tonnage of the same kind of Iron for its Berwick (Pa.) works. It is intimated that the United States Steel Corporation, which bought last week 25,000 tons of Bessemer Iron for December shipment at $15.50, Valley furnace, may buy a large tonnage of Iron in the near future for delivery in first quarter. There is a moderate inquiry for Foundry Iron, and Northern No. 2 is held at $16, Valley furnace, or $16.85, Pittsburgh. The American Cast Iron Pipe & Foundry Company has bought about 15,000 tons of Virginia Foundry Iron for its Southern works. Consumers of Forge Iron are pretty well covered, having bought pretty heavily in the past couple of months, and Northern brands of Forge are now offered at $15, Valley furnace, or $15.85, Pittsburgh.

Steel.—We note a heavy demand for Sheet and Tin Bars, and it is said that premiums of 50c. to $1 a ton are being paid over official prices for prompt deliveries. The Carnegie Steel Company is now operating all its various Steel plants to practically full capacity, the first time in more than a year. The Billet Association meets on December 20, when it is fully expected prices will be advanced. We quote Bessemer and Open Hearth Billets at $21; Forging Billets, $23; Long Sheet and Tin Bars, $23, and Cut Bars, $23.50, all f.o.b. Pittsburgh, to which freight to destination is added.

Coke.—Sales of Connellsville Furnace Coke for spot delivery have been made as high as $2.45 a ton, at oven. Some consumers of Coke who have contracts covering their requirements cannot get shipments fast enough and are compelled to come into the market occasionally and pay high prices for spot Coke in preference to shutting down their plants.

(*By Mail.*)

The event of the week has been the entrance of the United States Steel Corporation into the market as a buyer of Bessemer Iron, this interest having purchased, through the Carnegie Steel Company, 25,000 tons of Bessemer Iron at $15.50 per ton, f.o.b. Valley furnace, and all for December shipment. Of this Iron 10,000 tons was bought from the Bessemer Pig Iron Association and 15,000 tons through W. P. Snyder & Co. of this city. This purchase of Iron has naturally had the effect of further strengthening the market, and at this writing Bessemer and Basic Iron for December and January shipment are held firmly at $16, Valley furnace, or $16.85, Pittsburgh. It is possible that a few small lots might be picked up at $15.75 at furnace, but such tonnage would be very small. The supply of Iron for the first quarter of next year is said to be limited, as a good many furnaces are practically sold up for that period and at lower prices than are ruling now. It is claimed that the Carnegie Steel Company will need from 25,000 to 30,000 tons of Bessemer and Basic Iron a month through the first quarter of next year, and none of this Iron has yet been bought. It is possible that the Steel Corporation will make additional purchases of Pig Iron within the next week. The market on Foundry and Forge Iron, particularly the latter, continues very strong.

The outcome of the Billet meeting to be held on December 20 is awaited with a good deal of interest. It is generally expected that prices of Billets and Sheet and Tin Bars will be advanced about $2 a ton. The demand for Steel is heavy, consumers trying to cover ahead as far as possible in view of the expected advance in prices.

In Finished Iron and Steel changes in prices during the week involved an advance of $2 a ton on Galvanized Sheets and $1 per square on Corrugated Painted Roofing Sheets. The Cut Nail Association meets to-day and it is probable that prices of Cut Nails will be advanced 10c. per keg, or to the basis of $1.80, f.o.b. Pittsburgh. It is also expected that Plates and Structural Material will be advanced about $4 a ton at the meeting on December 20. It is practically certain that Plates will be advanced, but with Structural Steel it is not quite so certain. The tonnage in Finished Iron and Steel of all kinds is very satisfactory and the outlook is for a busy winter. The Coke producers are still suffering for lack of water and are unable to run their plants full. The Scrap trade is fairly active, but large consumers are pretty well covered and actual tonnage being sold is not as heavy as some time ago.

Ferromanganese.—A good deal of tonnage is being sold, owing to the starting up of a number of Steel plants. Prices are firmer than for some time, and we quote 80 per cent. foreign and domestic Ferro at $43 to $44, delivered, for large lots.

Wire Rods.—Inquiries are quite active, with a good deal of tonnage being sold. We quote Bessemer and Open Hearth Rods at $30 to $31, Pittsburgh, and note a sale of 500 tons of Bessemer Rods at $30, f.o.b. maker's mill.

Skelp.—We note a continued good inquiry, and several large contracts have been made in the past week. The mills are pretty well filled up for the next two or three months, and are very firm in their ideas as to prices. We quote: Grooved Iron Skelp, 1.55c. to 1.60c.; Sheared Iron Skelp, 1.60c. to 1.65c.; Grooved Steel Skelp, 1.40c. to 1.45c., and Sheared, 1.50c. to 1.55c. These prices are for ordinary widths and gauges, f.o.b. cars, maker's mill, terms 30 days, less 2 per cent. for cash in 10 days.

Muck Bar.—There is a fair inquiry, but consumers hesitate about paying the high prices asked by sellers. The mills that roll Muck Bar are having trouble in getting Forge Iron fast enough to keep running full, and for this reason are not disposed to sell except at good prices. We quote best grades of Muck Bar, made from all Pig Iron, at $27.50 to $28, Pittsburgh, and note a sale of 500 tons at the lower price.

Steel Rails.—It is generally believed that some large contracts for Steel Rails for 1905 delivery have been placed by the leading railroads. We continue to quote at $28 for Standard Sections.

Structural Material.—During the week the Cincinnati, Hamilton & Dayton Railroad opened bids for 5000 tons of Structural Steel for bridge work, but this tonnage has not yet been placed. Inquiries are better than for some time, the trade anticipating an advance in prices at the meeting on December 20. We quote: Beams and Channels, up to 15-inch, 1.40c.; over 15-inch, 1.50c.; Angles, 3 x 2 x ¼ inch thick up to 6 x 6 inches, 1.40c.; Angles, 8 x 8 and 7 x 3½ inches, 1.50c.; Zees, 3-inch and larger, 1.40c.; Tees, 3-inch and larger, 1.45c. Under the Steel Bar Card, Angles, Channels and Tees under 3-inch are 1.40c., base, for Bessemer, and 1.45c., base, for Open Hearth, subject to half extras on the Standard Steel Bar Card.

Plates.—Tonnage in Plates is coming in at a fairly satisfactory rate, but the mills are still in position to handle more business if they had it. It is true that a very large tonnage from the Steel car interest has been placed, and also by the boat building concerns, but the Plate mills can turn out an enormous tonnage and it requires a very active demand to keep them fully employed. Consumers are being advised to buy ahead as far as possible, in view of the expected advance in prices to be made at the meeting of the Plate Association to be held in New York next week. We quote Tank Plate, ¼ inch thick, 6¼ to 24 inches wide, 1.30c., base; over 24 inches wide and up to 100 inches in width, 1.40c., base, at mill, Pittsburgh. Extras over the above prices are as follows:

	Per 100 pounds extra.
Gauges lighter than ¼-inch to and including 3-16-inch Plates on thin edges	$0.10
Gauges No. 7 and No. 8	.15
Gauge No. 9	.25
Plates over 100 to 110 inches	.05
Plates over 110 to 115 inches	.10
Plates over 115 to 120 inches	.15
Plates over 120 to 125 inches	.25
Plates over 125 to 130 inches	.50
Plates over 130 inches	1.00
All sketches (excepting straight taper Plates varying not more than 4 inches in width at ends, narrowest end being not less than 30 inches)	.10
Complete Circles	.20
Boiler and Flange Steel Plates	.10
Marine, "A. B. M. A." and ordinary Fire Box Steel Plates	.20
Still Bottom Steel	.30
Locomotive Fire Box Steel	.50

Shell Grade of Steel is abandoned.

TERMS.—Net cash 30 days. For anticipated payments a maximum discount may be allowed at the rate of 6 per cent. per annum, and for a longer time than 30 days interest shall be charged at the same rate per annum. Invoices paid within ten days from date thereof, discount of ½ of 1 per cent. is allowable. Pacific Coast not included.

Sheets.—On December 8 the American Sheet & Tin Plate Company advanced prices of Galvanized Sheets $2 a ton and Corrugated Painted Roofing Sheets $1 per square. No advance was made in Black Sheets and none is expected in the near future. The demand for both Black and Galvanized Sheets is very active, consumers placing very liberal

orders, and some of the independent Sheet mills are quoting about $1 a ton higher than official prices and claim to be getting it. We have advanced prices on Galvanized Sheets $2 a ton and Corrugated Roofing Sheets $1 per square and now quote as follows: No. 27 Black Sheets, box annealed, one pass through cold rolls, at 1.95c.; No. 26, 2.05c.; No. 27, 2.10c., and No. 28, 2.20c. We quote Galvanized Sheets, as follows: Nos. 22 and 24, 2.75c.; Nos. 25 and 26, 2.95c.; No. 27, 3.15c.; No. 28, 3.35c. We quote No. 28 Gauge Painted Roofing Sheets at $1.60 per square for 2½-inch corrugation. Jobbers charge the usual advances over these prices for small lots from store.

Iron and Steel Bars.—The tonnage in both Iron and Steel Bars is heavy, consumers generally expecting an advance in prices on Steel Bars, and possibly on Iron Bars as well, before this month is out. The Cambria Steel Company and Republic Iron & Steel Company are both quoting 1.40c., Pittsburgh, on Steel Bars, which is $2 a ton advance over the official price. Specifications on contracts for Bars are coming in very liberally, consumers taking out maximum quantities on such contracts. We quote Refined Iron Bars at 1.50c., Youngstown, or 1.54½c., Pittsburgh. Some concerns that use a good deal of Scrap in their Bars quote a slightly lower price. We quote Bessemer Steel Bars at 1.30c., base; Open Hearth Bars at 1.35c., base, for carload lots, with the usual advances for small lots.

Railroad Spikes.—The demand continues heavy and the tone of the market is firm. We quote Railroad Spikes at $1.65 in carloads, and $1.70 in less than carloads per 100 lbs., f.o.b. Pittsburgh.

Hoops and Bands.—The market is quite active, the trade placing liberal orders. There has been no change in prices, but in view of the advances made on other finished lines it is not improbable that both Hoops and Bands may be advanced before long.

Tin Plate.—The demand continues very active, some of the independent mills advising us that they are able to secure 10c. to 20c. a box advance over the official prices. It is understood that a very heavy tonnage has been booked by the leading interest and outside mills as well, for delivery in first quarter and first half of next year. We quote Steel Hoops at 1.55c. and Steel Bands at 1.30c. to 1.35c., extras as per Steel card. Some mills refuse to shade the higher price for Bands.

Merchant Pipe.—The market continues in very satisfactory condition, some of the independent mills having practically their entire output sold up for the next several months. Prices are very firm, and there are intimations that another advance may be made shortly after January 1, if not before. Discounts to consumers in carloads are as follows:

Merchant Pipe.

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
	Per cent.	Per cent.	Per cent.	Per cent.
⅛ and ¼ inch	69	53	67	51
⅜ and ½ inch	73	61	71	59
¾ to 6 inches	77	67	75½	65½
7 to 12 inches	72	57	70½	55
Extra strong, plain ends, ⅛ to ¾ inch	62	50	60	48
⅛ to 4 inches	69	57	67	55
4½ to 8 inches	65	53	63	51
Double extra strong, plain ends, ⅛ to 8 inches	58	47	56	45

Boiler Tubes.—The demand for Boiler Tubes is more active than for some time and prices are quite firm, with the exception of Iron Tubes, on which concessions are sometimes made. Discounts to consumers in small lots are as follows:

Boiler Tubes.

	Steel.	Iron.
1 to 1½ inches	46	43
1¾ to 2¼ inches	58	43
2½ inches	60	48
2¾ to 5 inches	66	55
6 to 13 inches	58	43

Discounts on Boiler Tubes in carload lots are two points lower than the above.

Merchant Steel.—The mills continue to enter a liberal volume of tonnage, buyers placing large orders in the expectation that prices may be advanced. Some of the mills are already quoting higher figures. Specifications on contracts are coming in very freely and consumers are taking out maximum quantities on these contracts. While we make no change in prices, it may be noted that some of the mills are quoting slightly higher figures than are named below. We quote: Tire Steel, 1.50c. to 1.55c.; Open Hearth Spring Steel, 1.90c. to 2c., depending on order; Sleigh Shoe, flat, 1.45c. to 1.50c.; Cutter Shoes, tapered and bent, 2c.; Smooth Finished Machinery Steel, 1.50c.; Toe Calk Steel, 1.85c. to 1.90c. Cold Rolled Shafting is unchanged in price, being 52 per cent. off in carloads and 47 per cent. in less than carloads, delivered in base territory.

Spelter.—The market continues quiet but strong, and spot Spelter is scarce. The St. Louis market is higher and we have advanced prices on Prime Western Spelter for spot shipment and now quote 5.73½c. to 5.78½c., Pittsburgh.

Coke.—Prospects of the Coke trade for the winter and spring are better than for several years. The railroads have been adding to their equipment and it is believed that trouble this winter over shortage of cars will be less than for several years. The demand for Furnace Coke is really greater than can be supplied, but this is largely due to the water famine from which the Connellsville region has been suffering for several months. This shortage of water has restricted the output of Coke very much and no relief is yet in sight. The output of Coke last week in the Upper and Lower Connellsville regions was about 290,000 tons, a slight decrease over the previous week. Strictly Connellsville Furnace Coke is quoted at $2.15 to $2.25 a ton at oven, and several contracts at $2.15 have been made for shipment over the first six months of next year. The price of $2.25 a ton is obtainable for Furnace Coke for prompt shipment, since it is very scarce. Strictly Connellsville 72-hour Foundry Coke is held at $2.35 to $2.50 a ton at oven, some contracts having been made at the latter figure for Coke that has a very high reputation in trade. Main Line Furnace Coke, that is not quite as high in quality as Connellsville, is selling at $1.90 to $2 and Foundry at $2.25 to $2.50 a ton at oven.

Iron and Steel Scrap.—There is something of a deadlock on between consumers and sellers of Scrap, owing to the high prices asked by the latter. Most of the leading Scrap consumers have pretty well covered their requirements for the next two or three months at lower prices than are now ruling, and are willing to take chances on the market when they have to come in again to buy. The actual tonnage of Scrap being sold at present is small. We quote: Heavy Melting Scrap, $16; Cast Iron Borings, $10; Wrought Iron Turnings, $12.50; No. 1 Wrought Scrap, $17.50 to $18; Bundled Sheet Scrap, $13.50; Busheling Scrap, $13.50 to $14; Old Steel Rails, 6 feet and over, $16.50; Short Pieces, $16; Steel Car Axles, $18, and Iron Car Axles, $24, all in gross tons.

The offices of the Pittsburgh Steel Company, manufacturer of Wire Rods, Wire and Wire Nails, and Steel Fencing, have been removed from People's Bank Building to Nineteenth floor, Frick Building, Pittsburgh.

Cleveland.

CLEVELAND, OHIO, December 13, 1904.

Iron Ore.—The last cargoes from the head of the lakes are now on their way down, a few of them going to Buffalo, where the rates are more attractice than in other directions. It is now estimated that the total shipments by lake for the year will be about 21,000,000 tons. Added to this will be the shipments by all rail for the year, which usually amount to about 500,000 tons. Buyers have about let up for the year, having found it virtually impossible to get any more for this year's delivery. Interest naturally turns to the business for the ensuing year, but nothing has been done as yet in that direction other than very vague discussion of the possibilities of the reformation of the Ore Association.

Pig Iron.—The buying of Foundry Iron has been a little easier during the past week. There has been some good inquiry for material for spot shipment, but this has proved to be very scarce. Many of the furnaces in this territory are completely sold up for December and only have a moderate amount of Iron for shipment during the first quarter of next year. The price on No. 2 Foundry at Valley furnace is now steady at $16. The furnaces are generally not disposed to sell past April 1, unless it is to an established customer of long standing. The market has been fairly good. Many of the furnaces producing Bessemer are still out of operation, due to the shortage of Coke. The market for Basic is not changed, the producers not being willing to sell for remote future delivery at the prevailing price. The quotation on a few lots sold now is about $15.50 to $15.75 in the Valleys. Coke prices have held about as they were a week ago, with the supply still short. The best 72-hour Foundry Coke is quoted at $2.50 to $2.75. There has been some good buying of Furnace Coke at $2.25 to $2.50 at the oven.

Finished Iron and Steel.—New York stock market developments during the past week might have indicated a possibility of a contraction in the Iron and Steel business, especially in quarters like this which are so easily affected by such demonstrations. Nothing of the sort was seen, and the business seemed to have its normal volume. There was rather an extravagant demand for Bars, with a good increase and steady business in the Sheet trade. The Bar Iron prices are boosted a little, and more business is now being done at 1.60c., Youngstown, although some of the mills are still selling at 1.55c. Most of those in the market at that price either have a good supply of low priced Scrap on hand, or have made good big sales at the price with choice specifications. The users of Bar Iron, under normal conditions, have been switching to Bar Steel. In addition some of the agricultural implement works have been

steady buyers, and finishing mills have continued to take good lots of Bar Steel. The mills are expecting an advance in the price, and the assertion has been made that the advance would have been declared before this if it had not been for the deterring influence of policy, which dictates that nothing which would disturb the present buying mood ought to be done at the present time. The prices of Bar Steel, however, are considered only temporary since delivery is limited in most instances to January 1, although some sales are being made entailing a more remote delivery. The buying of Sheets has been of a somewhat better nature. There has been a good contracting movement on the new prices, and the buyers have already started to specify heavily against their contracts, indicating that the advance in prices did not stop the business to any extent. The buyers of Structural Shapes are not contracting very heavily at present. There has been fair specification on Plate contracts, and a little new buying but not much has been done. There is a big demand for Forging Billets, premiums being paid on most of such material now being sold. The quotation is $26.40, Cleveland, while some contracts have been taken as high as $27.

Old Material.—Most of the buyers spent last week trying to break the Scrap market, but have come here of late to buy rather freely, with the result that prices have been advanced steadily. We revise and quote, all gross tons: Old Steel Rails, $15 to $16; Old Car Wheels, $16; Heavy Melting Steel, $16 to $17. All net tons: Cast Borings, $8; No. 1 Busheling, $14.50 to $15; No. 1 Railroad Wrought, $18; Iron Car Axles (nominal), $20 to $22; No. 1 Cast, $15 to $15.50; Stove Plate, $10; Iron and Steel Turnings and Drillings, $12.

Birmingham.

BIRMINGHAM, ALA., December 12, 1904.

At a season of the year when the market usually adapts itself to the cleaning up of yards and the taking of stock, and turns an unwilling ear to the seductive offerings of sellers, the Iron market has taken the bit in its teeth and must run its course. At this writing Iron cannot be quoted on a a higher basis than $13.50, but there have been sales on a higher basis. The demand is greater than the supply, and there is a disposition on the part of sellers to go slow in making sales. The amount available for prompt shipment is so small that those so fortunately situated as to have any can command a premium over current quotations. This occurs every day, though not always reported. Orders are being scaled down every day. Each interest is striving to take care of its regular trade, and in many cases orders that are declined from one buyer are accepted from another. Some interests are entirely out of the market as far ahead as the second quarter, and there is not much selling now for that quarter. One of the 10,000-ton lots reported last week, it has leaked out, was for delivery the second quarter of the coming year and the price paid was $13.25. It was taken by one of the Pipe companies. The buying has been general, and in their eagerness to obtain Iron buyers have bid the market up on themselves. As to increased production, there is very little probability of any material increase in the near future. There will be increases in some directions and a falling off in others. The account when balanced won't show much advantage either way. For the period immediately ahead of us there can be no increase, for the holidays are right ahead of us, when production always sags. It is going to put some interests on their mettle to deliver sales made at maturity.

There were sales made during the week at $13.50, but the majority of the sellers contended for $13.75 basis for No. 2 Foundry, and they got it. From that point it sold up to $14.50 basis for No. 2 Foundry, depending upon conditions of sale. Many buyers held off because of the approach of the Christmas holidays, which would bring a sagging market and lower prices. They held off too long, and were caught by higher values, and had to take their medicine. In our crippled condition it was easy to mark up prices. These extreme prices are not given as the prevailing prices. They are simply the pioneers of the prices that look probable now. The largest sales reported were one lot of 1500 tons on the basis of $13.75, and another lot of 1000 tons on the same basis. There was also one lot of 1500 tons of No. 3 Foundry at $13, and one lot of 750 tons of Gray Forge at $12.50. There was sold also some No. 2 Soft at the same price as No. 2 Foundry. As to the aggregate of the sales, they were limited because of inability on the part of sellers to meet the demand. In a number of cases orders on which the price was acceptable were declined because of inability to supply them. There is a very confident feeling as to the future of prices, and there is none on the anxious seat concerning that.

The situation in regard to Coke is not flattering. There are some contracts out at $2.50, delivered, but there have been large purchases made in which the price ranges from $3 to $4. This price has been established of late, and your correspondent is assured that at them sales are being made. The United States Pipe Works is running full time, and but a short time ago shipped in one lot 25 cars of Pipe to the isthmus. It has large contracts of the same nature to follow, and enough orders are booked to keep it busy for long months to come.

The demand for Coal is incerasing and is being moved as fast as mined. Reports vary as to price, some reporting it at $1.25 at the mines for Slack and at $2.50 to $3.50 for Screened and Lump Coal. That brings up the question of the strike, which we can dismiss with the remark that it is petering out. Every day some of the United Mine Workers are straying off to the open mines and are given employment without prejudice. The organization is still kept up and every effort is being made to keep life in it. During the past week a batch of miners, with their families, who had been imported from West Virginia to work in the mines of the Tennessee Company, were offered by the order of the Mine Workers a free passage back to their homes if they would return. It was accepted by a small number, but it had no general effect. The company was willing to lose them. The test of these conditions is the amount of the output, and this has been gradually growing, until it has now reached the highest point since the inauguration of the strike, and the operations would indicate that the strike was practically ended.

The New York Machinery Market.

NEW YORK, December 14, 1904.

The special features which have dominated the machine tool trade for the past few months, and which have been the cause of the greatly increased business, are displaying considerably more activity both in the buying of tools and the preparation of plans for further extensive purchases. Those two great mediums—the Japanese Government and the Pennsylvania Railroad Company—through which the trade is reaping a good harvest, continue to be the center of interest, not only in New York, but throughout a greater part of the country, from which are reported the placing of many large orders. It will be remembered that when the Japanese Government started extensive buying of machine tools Germany and England received the lion's share of the orders. Since then greater attention has been given to American products, resulting in the purchase a short time ago of about all the lathes that were available for quick delivery. The Japanese have now come to recognize the superiority of American tools and are placing large orders. We understand that those who have the authority to select the machines to be purchased are very favorably impressed with our lathes especially, and are likely to buy quantities of this class of tools in the near future as well as other machinery. Heretofore we have referred almost exclusively to the buying of machine tools and other equipment for machine shops, foundries, power plants and other buildings which usually compose a complete mechanical plant, but of late the purchases of other materials have been so extensive as to attract considerable attention because of the favorable effect they will have on business in general, including many lines of machinery. Probably the most conspicuous of our products being taken by the Japanese is cotton, which they have recently bought and are still buying in very large quantities in the South. Another event which augurs well for machinery merchants is the presence here of an important personage connected with the Bank of Japan, who no doubt intends to look over general conditions and incidentally meet the principal bankers with the view, possibly, of arranging for further loans.

The other important factor with which merchants have reckoned with great benefit to themselves continues its purchases, and will probably be in the market for some time to come, as its requirements are by no means covered. It is estimated in the "street" that the Pennsylvania Railroad has within the past three months placed contracts for machinery aggregating $600,000 in value, more than half the tools called for in its $1,000,000 list issued last summer. It is generally believed that the full amount will be arranged for around the first of the year. Even with this aggregation of new machinery the company will not have sufficient to equip its new shops which, by the way, are to be augmented by additional improvements not previously mentioned and plans for which are not far enough along to admit of details being made public. The projected improvements, however, are expected to be worked out soon, which will necessitate the issuing of specifications early in the new year for a great deal more equipment for new shops. In addition to this it must be remembered that the requisitions for 1905 have not yet been sent in from the existing shops along the various lines of the Pennsylvania Railroad for bringing the equipment up to the standard, and as soon as they are in hand and the requirements tabulated, it is predicted that the company will issue a list for 1905 that will be considerably larger than usual.

Owing to the similarity of interests in the two concerns, and also in view of the fact that one engineering department practically serves both, there has been some

confusion in the trade as to which of the new power houses of the New York Edison Company and the Brooklyn Rapid Transit is to be equipped with the apparatus purchased from time to time and noted in these columns. It seems likely that both power stations will be equipped with identical make of machines, though it is generally understood that the New York plant will have much the greater capacity. Plans, however, are subject to change and there is a bare possibility that before contracts are signed for the entire installation some substitutions may be made. As is well known, the boilers for both stations will be of Babcock & Wilcox make, while the turbo-generator sets will be furnished by the Allis-Chalmers Company and the Westinghouse Electric & Mfg. Company. So far as authoritative information will permit we can state that contracts have been placed for 12 steam turbines, at least six of which will be supplied by the Allis Company. On account of the many improvements to be made to the lines of the Brooklyn Rapid Transit Company and the need of that road for increased current, the management of the two corporations has decided to let the matter of equipment for the Edison station rest for a while and go ahead with the Brooklyn plant. Consequently the engineering department has exerted all its energies in that direction, with the result that now practically the entire equipment for the Kent avenue station has been purchased. The foundations for the building, which will be 200 x 300 feet, are in, the steel structure is being erected and bids are now being received for the rest of the superstructure, such as masonry, roof, floors, &c. This plant has been designed for 72 650 horse-power boilers, with their complement of turbo-generators of 5500-kw. capacity each, making a total of six turbines to be installed. The full equipment, however, will not be put in at once, but gradually as conditions require. The first installation will consist of one Allis and one Westinghouse steam turbine, aggregating 11,000 kw., which will be served by 24 Babcock & Wilcox boilers, divided into units of six boilers each, two units, or 12 boilers, for each turbine. Recent orders placed for equipment include that for the forced draft apparatus, which was secured by the B. F. Sturtevant Company, Hyde Park, Mass. A 50-ton Shaw crane has also been purchased from Manning, Maxwell & Moore, New York. In addition to its preparation for more power the company is planning to spend $250,000 for increasing its facilities. These will provide for a greater and more convenient arrangement of trackage, larger storage capacity, enlarged yards and new shops. All this work will necessitate the buying of a considerable quantity of new machinery, especially the shops, which are to be equipped with the most modern machinery. The proposed construction of new shops at Thirty-sixth street and Fifth avenue was mentioned in this market some months ago, and since then the preparation of plans has gone steadily forward. While the details are not yet procurable, it is hinted by those who ought to know that the matter will be ripe for the machinery merchants to step in and take orders within the next few months.

South Framingham, Mass., is to have a new industry, which bids fair to attract a good deal of attention among machinery merchants in this district, especially until the company has equipped its new plant. It is none other than the Robb-Mumford Boiler Company, Incorporated, Amherst, N. S., maker of the Mumford internally fired boiler, which has purchased 10 acres of ground in South Framingham, on the main line of the Boston & Albany Railroad. On this site will be erected as soon as possible a steel and concrete building, 150 x 300 feet, which will be fitted up with electric cranes and all modern appliances which constitute an up to date boiler shop. The foundations for the plant are now under way, and side tracks are being put in by the railroad company. D. W. Robb is president; F. H. Keyes, general manager; G. W. Cole, secretary and treasurer, and J. A. Mumford, consulting engineer. The company has offices in Boston, New York, Pittsburgh and Chicago.

The two-story building, 60 x 240 feet, on Elam street, adjacent to the main plant of the Lodge & Shipley Machine Tool Company, Cincinnati, Ohio, now occupied by the Oesterlein Machine Tool Company, will be vacated by the latter at the expiration of its lease on January 1, the Lodge & Shipley Company taking possession then, and who will thoroughly equip it with the necessary tools and appliances for the sole production of its 14 and 16 inch sizes of engine lathes. The other sizes made by the company will continue to be produced in the main shops.

The Bethlehem Steel Company, South Bethlehem, Pa., has been buying considerable machinery this past week. The company has under way plans for large additions to its plant which have been previously outlined, but we understand that some of the improvements are now being made. Not very long ago it placed a large order with a prominent house for equipment, and since then has come into the market several times for machinery.

The Charles P. Biggin Company, Philadelphia, Pa., is to erect a two-story brick addition to its plant, 35 x 100 feet, which will be used principally for more bench room for the workmen. The company will, however, require some new machinery. It will probably purchase a medium weight double punch, four or five drill presses, emery grinder and buffer, with necessary pulleys, shafting, &c.

Among the new corporations requiring some tools is the Staples Valve Company, Newburgh, N. Y., which was recently incorporated to manufacture a flushing valve operated by pneumatic power, patented by John A. Staples. The company does not anticipate building an extensive plant at present, but will probably purchase some lathes and tools such as are ordinarily used for turning out a similar product. The company is composed of John A. Staples and C. H. Hanford.

From general reports it would appear that the Japanese Government has been buying very little machinery in the East outside of lathes, but as more light is let in on the purchases numerous other machine tools are seen to figure prominently among the shipments to the Far East. The Colburn Machine Tool Company, Franklin, Pa., is one of the fortunate ones, it having secured some orders for boring mills for Japan.

The American Car & Foundry Company, New York, which is to install shops in the vicinity of London, England, for erecting the all steel passenger cars it is to build for the London Underground, has placed an order with John McDonald & Son, Glasgow, Scotland, for the entire pneumatic equipment, including four Ingersoll-Sergeant air compressors, 125 Haeseler pneumatic hammers and drills and accessories.

The United States Brick Company, Reading, Pa., has been incorporated, with a capital stock of $5,800,000, with A. A. Gery president. The company already controls four brick plants in Pennsylvania, and intends to build factories in many of the large cities to make brick under the patents of Mr. Gery. New plants are projected for Washington, Baltimore, New York, Hartford, Boston, Pittsburgh and Cleveland.

The following awards have been made for machine tools for the Portsmouth, Boston, New York, League Island, Norfolk and New Orleans navy yards, bids for which were opened November 8:

Manning, Maxwell & Moore, New York, class 1, one improved patent head engine lathe, $2000; class 2, one 48-inch improved patent head engine lathe, $3873; class 3, one 42-inch improved patent head engine lathe with 25-foot bed, $3400; class 4, one 36-inch improved patent head engine lathe, with 15-foot bed, $2600; class 5, one triple geared engine lathe, $5500; class 6, one pattern makers' lathe, motor driven, $940; class 10, one set No. 4 plate straightening rolls, motor driven, $4900; class 31, one 28-inch drill press, $205; class 43, one 10-ton pulley block bridge traveling crane, also one 3½-ton and two 2-ton cranes, $2912; class 48, one combined steam and hand steering engine, $1350.

Niles-Bement-Pond Company, New York, class 7, one planing machine, motor driven, $4020; class 9, one set No. 8 plate bending rolls, motor driven, $7250; class 16, one engraving machine, $798; class 22, one No. 3 angle shear, $2120; class 26, one 800-pound single stand steam hammer, $780; class 29, one No. 3 full universal Bickford radial drill, $1525; class 37, one motor drive outfit for Bement-Miles No. 4 combination punching and shearing machine, $535; class 39, one motor drive outfit for double angle shear, $436; class 40, one motor drive outfit for horizontal bender, $410; class 41, two 15-ton three-motor electric traveling cranes, $7000; class 42, two 40-ton three-motor electric traveling cranes, $10,150.

Wm. Sellers & Co., Philadelphia, Pa., class 8, one planing machine, $4040; class 38, one motor drive outfit for Wm. Sellers & Co. combined punching and shearing machine, $450.

Scully Steel & Iron Company, Chicago, Ill., class 11, one set horizontal rolls for bending boiler shell plates, $8595; class 12, one pipe flanging and expanding machine, $3565; class 13, one pipe flanging and expanding machine, $3465; class 24, one rotary splitting shear, $3000.

Diamond Drill & Machine Company, Birdsboro, Pa., class 14, one 18-inch electrically driven cold saw cutting off machine, $765; class 15, one 18-inch cold cutting off machine, $445.

Fairbanks Company, New York, class 17, one band sawing machine, $470; class 30, one 16-inch sensitive drill press, $149.

Walter H. Foster Company, New York, class 19, one three-spindle milling machine, $4572.50; class 20, one four-spindle planer type milling machine, $5933.

Edward J. Etting, Philadelphia, Pa., class 21, one motor driven bar iron shear, $890.

Joseph T. Ryerson & Sons, Chicago, Ill., class 23, one rotary bevel shear, $1080.

Chicago Pneumatic Tool Company, New York, class 27, one duplex air compressor, $3775.

Sherman-Brown-Clements Company, New York, class 28, one deck winch, $529.40.

Mechanical Machine Company, Rockford, Ill., class 32, one 13-inch sensitive drill press, $78.

Prentiss Tool & Supply Company, New York, class 33, one 300-ton 50-inch double quick hydrostatic car wheel press, $1490.

Long & Allstatter Company, Hamilton, Ohio, class 34, one motor drive outfit for size B Long & Allstatter beam punch, $515.

Bullard Machine Tool Company, Bridgeport, Conn., class 35, one motor drive outfit for 51-inch Bullard vertical boring and turning mill, $577.

Detrick & Harvey Machine Company, Baltimore, Md., class 36, one motor drive outfit for Detrick & Harvey 48-inch open side planer, $430.

Geo. F. Blake Mfg. Company, New York, class 45, one 2-inch vertical shaft centrifugal pump, $310.

Buffalo Forge Company, Buffalo, N. Y., one duplex steam pump, $1090.

Laconia Car Company Works, Boston, Mass., class 49, three 32-foot drop side coal cars, $2340.

No awards were made for class 18, one motor driven Scriven horizontal punching beam; class 25, one 60-pound helve hammer; class 41, one 10-ton locomotive crane, and class 47, two compound duplex outside plunger pot valve pumps.

The following bids were opened December 3 for coal storage and coal handling plant for the New Orleans Naval Station:

The Brown Hoisting Machinery Company, New York, item 1, $143,440.

New Jersey Foundry & Machine Company, New York, item 1, $240,000.

The Wellman-Seaver-Morgan Company, Cleveland, Ohio, item 1, $147,897; 2, $147,714.

Penn Bridge Company, Washington, D. C., item 2a, $148,000; b, $145,000; c, $147,250; d, $148,000; e, $148,000.

Augustus Smith, New York, item 1a, $129,400; b, $150; c, $23,620; d, $2900; e, $5150; f, $5090; g, $19,500; h, $11,000; i, $16,600.

The Snare & Triest Company, New York, item 1, $146,000; 2, $147,000; 3, $144,000; 4, 144,000; 5, $146,000; 6, $148,000; 7, $148,000; 8, $7500; 9, $11,400; 10, $16,000.

The Scofield Company, Philadelphia, Pa., item 1, $146,700; 1a, $148,000; 1b, $144,000.

Contract for furnishing electric torpedo air compressors for the navy, bids for which were opened November 28, has been divided between the Platt Iron Works Company, Dayton, Ohio, and the E. W. Bliss Company, Brooklyn, N. Y.

Catalogues Wanted.—Carlowitz & Co., 15 William street, New York, having their own houses in China, Japan and Germany, with connections at other foreign points, would like catalogues and export discounts from all manufacturers of products suitable for export.

Iron and Industrial Stocks.

NEW YORK, December 14, 1904.

Owners of stocks passed through a disagreeable experience since our last report. The stock market suffered from two severe attacks of a malady which might be called "Lawsonia," inflicted by Thomas W. Lawson of Boston through advertisements in the daily papers, particularly attacking the Amalgamated Copper Company. The stock of that company suffered seriously, dragging down other values with it. The severest effects of these attacks were felt on Thursday of last week and Tuesday of this week. Some slight recovery took place between these dates. The lowest points touched in active stocks usually treated in this report were as follows: Can common 9½, preferred 57; Car & Foundry common 29, preferred 89¼; Locomotive common 30, preferred 100½; Colorado Fuel 37; Pressed Steel common 34½, preferred 87; Railway Spring common 29½, preferred 89½; Republic common 14, preferred 65; Sloss-Sheffield common 57, preferred 102; Tennessee Coal 61½; United States Steel common 23½, preferred 84, new 5's 88. Last transactions on active stocks up to 1.30 to-day were made at the following prices: Can common 10⅛, preferred 58½; Car & Foundry common 31, preferred 91; Locomotive common 31¾, preferred 101; Colorado Fuel 44½; Pressed Steel common 38, preferred 89; Railway Spring common 30¾, preferred 90; Republic common 15½, preferred 67; Sloss-Sheffield common 59¾, preferred 102; Tennessee Coal 68¾; United States Steel common 28, preferred 89⅛, new 5's 91.

The American Iron & Steel Mfg. Company, Lebanon, Pa., has issued a circular to stockholders, signed by J. H. Sternbergh, Arthur Buck and James Lord, suggesting a reduction of common stock shares of the company from 340,000 to 51,000, and assessing each common share $2.50, making it paid up stock. In substance, the recommendation is that each six and two-thirds shares common will be issued as one share new paid up stock. It is stated that two-thirds of the preferred stockholders and three-fourths of the common stockholders have assented to the proposed change. As $5 has been paid on the common shares, the additional $2.50 will make $7.50 for each, and consequently the new shares, made up of six and two-thirds of the old, will be $50 each, paid up. The company now has a capitalization of $3,000,000 preferred and $17,000,000 common, par value $50. The new capitalization will be $3,000,000 preferred and $2,550,000 common.

The stock of the Wheeling Steel & Iron Company, Wheeling, W. Va., advanced last week to $120 bid and $125 asked. It is stated that the company will soon declare a dividend.

The Sloss-Sheffield Steel & Iron Company reports for the quarter ended November 30:

	1904.	1903.	Changes.
Net profits from operations	$214,707	$329,804	Dec. $115,097
Taxes and interest	60,000	60,000	.....
Balance	$154,707	$269,804	Dec. $115,097
Preferred dividend	114,000	114,000	.....
Surplus	$40,707	$155,804	Dec. $115,097
Depreciation and rental fund	.....	44,189	Dec. 44,189
Surplus	$40,707	$111,615	Dec. $70,908
Actual previous surplus	2,441,211	2,224,497	Inc. 216,714
Total surplus	$2,481,918	$2,336,112	Inc. $145,806

The strike of the union miners was in force during the entire quarter.

Dividends.—Sloss-Sheffield Steel & Iron Company has declared the regular quarterly dividend of 1¾ per cent. on the preferred stock, payable January 3.

General Electric Company has declared a quarterly dividend of 2 per cent., payable January 14.

National Enameling & Stamping Company has declared the yearly dividend of 7 per cent. on the preferred stock and 2 per cent. on the common stock, payable in quarterly installments of 1¾ per cent. and ½ per cent., respectively, January 1, April 1, and July 1. The three quarterly payments are made in order to bring up the dividend payments to the end of the fiscal year, which ends June 30. The dividend on the common stock has been reduced 2 per cent. per annum in order to strengthen the reserve fund.

Westinghouse Air Brake Company has declared the regular quarterly dividend of 2½ per cent. and an extra dividend of 2½ per cent., both payable January 10.

Otis Elevator Company has declared a quarterly dividend of 1½ per cent. on the preferred stock, payable January 14.

United Shoe Machinery Company has declared a quarterly dividend of 1½ per cent. on the preferred stock and 2 per cent. on the common stock, both payable January 14.

The New York Warrant Market.

NEW YORK, December 14, 1904.

Less activity prevailed in the market for Pig Iron warrant certificates during the week just closed, the amount of sales being somewhat over 3200 tons, or less than half the transactions of the previous week. The quotations at which January, February and March delivery sales were made held fairly steady and were but slightly changed from the prices established on call, Wednesday of last week. In detail the sales were: January, 1500 tons; February, 500 tons; March, 400 tons; April, 100 tons; May, 500 tons; June, 200 tons.

At the time of going to press the prices established on call are decidedly higher than those noted here a week ago. They are:

	Bid.	Asked.
Cash	$17.00	.....
December	17.00	$17.50
January	17.10	17.40
February	17.10	17.40
March	17.10	17.40
April	17.10	17.40
May	17.20	17.45
June	17.10	17.30
July	17.10	17.30

The Niles Iron & Sheet Company.—Some changes have recently been made among officials of the Niles Iron & Sheet Company, Niles, Ohio. James J. Paterson, formerly president and manager, has sold out his interest and retired. W. A. Thomas, formerly secretary and treasurer, has been made president. C. G. Thomas has been elected secretary and treasurer. H. M. Robinson and John McVey have retired as directors, and their places have been filled by the election of Ira Thomas and Clinton G. Thomas of Niles. The plant contains four sheet and four pair furnaces, two double annealing furnaces, one bar mill, four hot sheet mills and two cold mills, the product being black sheets and the annual capacity about 12,000 net tons.

It is stated that John D. Rockefeller has presented about $2,000,000 to the University of Chicago for the establishment of an engineering school at the university. It is understood that plans for the new structure have been outlined and that the course of study has been laid out.

Roller Bearing Axles for Cars.

At least one American railroad is convinced that the roller bearing axle for passenger cars is worth elaborate experimental test in actual service and has ordered the necessary roller bearing equipment for two passenger trains. The idea is not a new one, but the earlier inventions were handicapped by their cost and also by mechanical weaknesses, especially in the tendency of the bearings to get out of alignment. The progress of machine grinding has now rendered it possible to produce case hardened steel rolls of exact size at low cost, which is an important element in the success of recent designs of bearings of this type. Railroad men are convinced that the experiment is worth trying, especially as some pioneer work has been done abroad.

A passenger car so equipped has been in operation for two years as a part of a train running between London and Brighton, England, and during this period it has traveled 80,000 miles. The bearings have stood the test well and the company has ordered a complete train equipped with them, believing that valuable comparisons in economy may be made with trains of similar make-up with ordinary axle bearings. It is claimed that the starting resistance of such a car is reduced to 3 pounds per ton, there being very little static friction to overcome. With a train making frequent stops, or running on a line requiring slowing down at bridges, on quick curves or on heavy grades, this advantage may be very considerable in saving time, because full momentum is acquired more quickly. It is also claimed that a saving of 10 pounds of coal per mile has been obtained on the train having but one of the cars equipped with roller bearings. The axle boxes take little, if any, more space than the usual type. On each journal is tightly fitted a hardened steel sleeve, ground to be quite parallel and 7-16 inch thick. The rollers act between this sleeve and an exterior sleeve, which is as nicely ground. There are 14 of the rollers to each box, ⅞ inch in diameter and 8 inches long. They are case hardened and ground to accurate size. They are held in a gun metal lantern, which revolves slowly around the journal, the lantern preventing the rolls from touching one another.

Railroads are usually slow to take any such radical change in car equipment, because of the feeling that to complicate the running gear may add to the danger of accident. Yet once that such a device has been proved safe and practical in commercial service—economical in coal consumption and efficient in increasing average speed without necessarily increasing maximum speed—then railroad men will accept it as a matter of course. Modern railroad equipment contains many instances of devices that were received with doubt and distrust when first brought out, but which to-day are considered a part of the standard equipment. Perhaps the roller bearing axle may prove to be such a device.

One of the most important steps ever taken in this country to perfect the automobile has just been outlined by several engineers and designers representing large automobile factories, and a meeting has been called by all interested in the motor car industry for January 19 in New York. This new organization will be known as the Superintendents' and Engineers' Branch of the Association of Licensed Automobile Manufacturers, and its main objects will be to study methods whereby American machines may be simplified in mechanism and reduced to the lowest possible level in cost of construction and maintenance. When the organization is definitely completed at the meeting next month it is the purpose to have it deal entirely with constructional questions, and to act in an advisory capacity to the manufacturers.

Furnace No. 2 at the New Castle group of the Carnegie Steel Company, New Castle, Pa., has been completed and was put in operation last week. The new stack is 20 x 94½ feet and is equipped with four Massicks & Crooke stoves, each 21 x 85 feet, and has a daily capacity of about 500 tons. The annual capacity of the four new furnaces at New Castle is as follows: No. 1 stack, 150,000 tons; No. 2, 160,000 tons; No. 3, 160,000 tons; No. 4, 160,000 tons, or a total annual capacity of 630,000 tons. These four furnaces are equipped with two Heyl & Patterson pig iron casting machines.

The Quality of Immigration.

The annual report of the Commissioner of Immigration contains significant figures which are worthy of serious consideration and suggest the needed tightening of the restrictions which the Government places on the admission of foreigners. There is some encouragement in the report in that the total immigration was 44,000 less than for the previous fiscal year and that the average was higher in physique, intelligence and morals, and also in funds brought over by these aliens. But even with these improvements the figures are menacing. Of a total of 812,870 immigrants 168,900 could neither read nor write, and, in addition, about 4000 could read, but not write. This number must also include the children under school age or who have never been to school, but the children of immigrants are generally better educated than their parents. The total of illiteracy is startling. To put the requirement of being able to read and write on immigration the decrease would be marked, and many of the most undesirable of the aliens would be retained in their own countries.

The figures from Italy and Austria-Hungary will not be viewed with regret, because both of these nations lead in our immigration. Italy shows a decrease of more than 37,000, bringing the figure down to 193,000, while Austria sent over 177,000 of her people, a falling off of nearly 29,000. Russia is third, with 145,000. Greece decreased to 11,300, a loss of 2700. Nearly 422,000 of this new population comes from the Italian, Polish, Slovac and Magyar races, but this is a considerable loss by comparison with the previous year.

The more desirable immigration of Great Britain and northern Europe showed an increase, taken altogether, though Norway and Sweden fell behind. The German immigration increased by 6300, to 46,400; England increased 12,400, to 58,600; Scotland increased 5000, to 11,100; Ireland increased 830, to 36,100; Sweden decreased 18,265, to 27,700, and Norway decreased 650, to 23,800.

The Commissioner considers the year's immigration of much higher grade, morally, physically and intellectually, than that of the preceding year. The immigrants brought more money with them, as shown to the immigration officers, the total being about $21,000,000, which is nearly $5,000,000 more than the total for the preceding year, with its 44,000 greater number. This is well. So is it well that the immigrant is better qualified by health and brain to take up the American life. But it is not well enough considering conditions as they are in the United States. Immigration would not be noticed unfavorably if it were coupled with a system for distributing the newcomers where their services would be of value to the community. Until the time comes when such a system is in operation still greater decrease in numbers and increase in personal standard will be sincerely desired.

George Westinghouse of Pittsburgh is reported to have secured for the Westinghouse Companies a copper property in Arizona which gives evidence of ability to supply not only the Westinghouse interests' needs, but produce a surplus. The property is located in what is known as the Washington Camp, 40 miles from Bisbee, and Westinghouse interests are said to have spent over $600,000 in getting together the properties, exploring and equipping them.

S. R. McDowell, receiver of the Liebrandt & McDowell Stove Company, Philadelphia, offers all or any part of the company's stove and other patterns, together with flasks, &c., for immediate sale. Catalogue and further information will be given on application.

The Methods of a Modern Industrial Works.*

BY J. WILMER HENSZEY.

The Baldwin Locomotive Works, in Philadelphia, is probably as good an example of a modern industrial works as we have in the country, and as I have been connected with this company for some years I will endeavor to give you an idea of how that plant is operated.

The Baldwin Locomotive Works, at the present time, employs about 15,500 men, who are divided among 20 departments. The executive force consists of one superintendent, four assistant superintendents and 20 foremen. Owing to the extent of the works it is divided into two divisions, the eastern embracing all shops east of Fifteenth street, and the western division taking in all shops west of Fifteenth street, also new shops located at Twenty-sixth, Twenty-seventh and Twenty-eighth streets. Each division is in charge of an assistant superintendent, who works in conjunction with the foreman in his division.

In the eastern division the most important shop is the erecting or finishing shop, located at Broad and Spring Garden streets. This shop employs about 2500 men, and has a capacity of 50 finished locomotives every week. To operate this department we have one foreman, two assistant foremen and 20 track foremen. Every track foreman is a specialist on a certain line, such as erecting, valve setting, testing, &c., and has direct charge of the gang bosses and men who work under their supervision. The gang bosses, or contractors as we call them, are all picked men, the very best we can find, and have direct charge of the workmen. The same system of contracts is employed in every department throughout the works.

The Contract or Piece Work System.

I will now explain our contract or piece work system. Every department is a factory, manufacturing a certain number of locomotive parts. Through careful study we are able to ascertain the exact time and expense involved in making these parts; we then allow a certain amount of profit for the contractor in making a price; he, in turn, gives out his work—piece work—to his men at a slightly lower rate and makes the difference. There is a great diversity of opinion among manufacturers about the best way to pay labor. Some claim that you do not get the best results from the piece work system because a piece worker knows that he will not be allowed to make over a certain amount, and if he finds that he is making too much he will curtail his output sooner than run the chance of having his prices cut. This is true in some cases, but, under careful management, on routine work it cannot occur. We expect and get more work per man out of our piece workers than any similar concern in the world, and our men are allowed to make higher wages, and this, to my mind, explains why we never have strikes at Baldwin's.

In hiring a man we never ask whether he belongs to a union or not. We don't care. If he enters our employ he abides by our rules and regulations, which are posted in every department, and any attempt to incite trouble or dissatisfaction among the men is reported at once by his contractor and the man is dismissed.

A question that is often asked, is: "Do you not have great trouble in procuring workmen who are skilled in the special lines of locomotive works?" We do. This is the question to which the Baldwin firm has given a great deal of attention in the past four years, and has led to the revival in our works of the old apprenticeship system, a brief outline of which may be interesting.

The Apprenticeship System.

The apprentices are divided into three classes—namely, first, second and third. To be a first-class apprentice a boy must be 17 years old, and must have at least a grammar school education. He serves four years. During this time he is allowed to stay on one class of work only three months, and is moved from department to department until he covers the entire plant. During the school season he is obliged to attend night school two nights a week, taking up a special course in higher mathematics and mechanical drawing. He is paid from $3 to $6.60 per week during apprenticeship, and on completion of his time receives a certificate and $250. A second-class apprentice must be a high school graduate and serve three years on the same lines as a first-class apprentice. He also attends night school. He gets from $4.20 to $6.60 per week, and on completion of time receives a certificate and $200. A third-class apprentice must be a graduate of a recognized technical school. He serves two years and does not take a night course. He gets from $9 to $12 per week and receives a certificate on completion of time.

We now have between 400 and 500 apprentices of the several classes, and it is proving of vast benefit to the works in providing a more intelligent and better class of labor than it is possible to get in any other way. We claim that, whether the apprentice stays with us or not on the completion of his time, he will always be a friend to the Baldwin Locomotive Works and look out for our interests, just as a college man does for his college. His training has made him a valuable man for railroad work, and one who will get ahead. It is a far sighted business proposition.

Improvements Encouraged.

A manager of a large shop has many other important matters to look after. If he is a progressive man, backed by a progressive firm, he wants to know the quickest and best way to get out work. Our firm encourages this among the foremen, and sends them all over the country to see how other people do work. If a foreman can prove that by the use of certain tools and appliances he can save time and expense, they are furnished him without question. During the past five years enormous strides have been made in this direction. By the aid of improved hydraulic and pneumatic tools hand work has been reduced to a minimum, and on this alone nearly $1,000,000 a year is being saved on the cost of work in the shops. We have also made great savings on time required to do work by the use of specially treated tool steel for machine tools. By means of these tools we have been able to increase the capacity of some of our machines from 30 to 50 per cent. Our best results have been obtained from the Burgess special steel and the Sanderson special steel. All our new tools are being made from these steels, as ordinary tool steel will not stand the high speeds at which our tools are now being run.

It is interesting to see the vast difference between an up to date railroad or locomotive shop in this country and a similar shop on the other side. It has been my opportunity to visit a number of these shops in England, Sweden, Finland and Russia, and it is surprising to note the condition of their equipment. Power cranes are very rare even in the larger shops and the machinery is of a type in use here 25 or 30 years ago. It is not strange, noting these conditions, that we can build locomotives in Philadelphia, ship them to any country in Europe and put them in service on their railroads 10 to 20 per cent. cheaper than they can build them in their own shops.

Disposition of Orders in Shops.

As orders for locomotives are received, they are printed on lists and put out in the shops. Each list contains two weeks' work; they are dated with delivery dates for each class of work in the various departments.

The designation of the different classes of locomotives as used by Baldwin Locomotive Works embodies the combination of certain figures with one of the letters A, B, C, D, E and F to indicate both the number and kind of wheels and the size of cylinders. Thus, a locomotive having one pair of drivers is classed B; that with two pairs, C; that with three pairs, D; that with four pairs, E, and that with five pairs, F. The letter A is used for a special class of high speed locomotive with a single pair of drivers. A figure 4, 6, 8, 10, 12 or 14 is used as an initial figure to indicate the total number of wheels under a locomotive. A figure or figures following the initial

* Paper read before the Franklin Institute, Philadelphia, October 19, 1904, and reprinted from the December *Journal* of the Institute.

figure indicates diameter of cylinders, and the figure or figures following a class designation represents the consecutive class number of a locomotive on which it appears. Thus, 8 16 C 500 indicates a locomotive with eight wheels in all, having cylinders 16 inches in diameter, with two pairs of driving wheels, and the five hundredth locomotive of its class. As soon as lists are put out the drawing rooms get them and start at once to design the locomotive, furnishing bills of material to the purchasing department, which orders all material we do not make. Lists are also furnished to every foreman and contractor in the entire plant. The great advantage of these lists is that every man in the entire works is after the material he needs long before it is wanted in the erecting shop, and we are rarely subjected to delay on delivery dates. Every foreman has a book of lists—check books we call them—in which he keeps an exact daily check of every piece of work made in his department. He, in turn, checks off the superintendents, who can tell by a glance at their books the exact condition of every locomotive part in the entire works.

The Accounts.

An important factor in the management of a large plant is the system of accounts. The Baldwin Locomotive Works keeps two sets of accounts, viz.: 1, Manufacturing account; 2, commercial or financial accounts.

In the manufacturing books a ledger account is kept with each locomotive constructed and with each repair work job. All materials and labor are charged to these accounts either directly or eventually on closing the books. The principle is that no material or labor is paid for without being charged to an appropriate account.

In the commercial books accounts of dealings with individuals and corporations are kept in the ordinary way. Both sets of books are closed annually and correspond exactly in their statements of expenditures and receipts.

The system of manufacturing accounts is thus described: In the general system of accounts by which the cost of construction of locomotives is ascertained each locomotive is charged as follows:

A—Materials.—All materials used in the construction of the locomotives at the actual cost as fixed in the general contracts covering such purchases, or as paid for same at market rates.

B—Distributed Labor.—All labor charged directly to the locomotives at actual cost of same, either by piece work or day work rate.

C—Expenses.—All labor and materials incident to the construction of the locomotives, but which from their character cannot be charged direct. The cost of these is distributed to the locomotives in the proportion fixed by the amount of distributed labor as per paragraph B. Until this proportion is finally determined for each year it is based upon the accounts for the preceding year. The expenses include wages of managers, foremen, clerks, draftsmen, stationary engineers, teamsters, laborers, watchmen, traveling engineers and messengers. They also include heating, lighting, repairs, insurance, taxes and other expenses on buildings, and tools, patterns and dies, defective work, printing, advertising, traveling expenses and all incidental costs connected with manufacture.

D—Disbursements for Freight and Delivering Locomotives.—These consist of railroad charges for transportation to point of delivery.

The aggregate of the foregoing items is the cost of manufacture and delivery of locomotives.

Tests.

One of the most important departments and one whose influence is felt over the entire works is the test department. This is equipped with two Tinius Olsen testing machines for physical tests and a complete chemical laboratory for chemical analyses, also with apparatus for indicating locomotives and stationary engines. Nearly all the material we use must first pass through this department and be reported on before being accepted; this applies to all boiler steel, spring steel, tank steel, bar iron, cylinder iron, steel castings, oils, paints, &c. We have fixed standards for all these materials, which must be complied with before materials are accepted. The test department also has a corps of inspectors, who are stationed in the various rolling mills and steel plants we deal with, and whose duty it is to see that our mill specifications are lived up to, and that our orders are rushed through.

Some Shop Details.

One of the important duties of a shop manager is the care of machinery. These machines represent thousands of dollars, and it is of the utmost importance that they be kept in perfect repair. To accomplish this we have in every shop a machine inspector or tool boss. This man is an expert on repair work, and has a gang of machinists under his supervision. As soon as a machine breaks the fact is reported to the tool boss, who repairs it at once. A number of duplicate pieces of the most breakable parts of machines are always kept in stock, so that the machines are seldom down but for a very short time.

In every large plant, especially one having large smith shops and foundries, there is a constant danger of fire; to overcome this we have, I think, one of the largest volunteer fire departments in the country, having about 200 picked men scattered all over the works. We have 12 large Barr pumps and as complete apparatus as the city department. Every shop also is equipped with a sprinkler system and has stand pipes and reels of hose on every floor. Every few weeks we have fire drills, and it is remarkable how quickly our men can get into service. They put out on an average of two or three fires a month, and for several years have not had to call on the city fire department.

Another important matter is shop cleanliness. The sweepings must be run through separators, then loaded on cars and sent to firms who buy all our turnings. Our sheet iron scrap is carted to large scrap bins built over railroad tracks in one of our yards. These bins have hinged bottoms, and when they are full cars are run under them and loaded. This material is also sold, and proceeds from scrap and turnings amount to several hundred dollars a week.

The Power Plant.

The power of the works is handled by the highway department, which is also responsible for buildings, electric power and light and machinery repairs. We have four large power houses, one at Broad street, one at Sixteenth street, one at Seventeenth street and one at Twenty-seventh street, having 31 boilers, generating 10,684 horse-power. Each power house is in charge of a chief engineer, who makes a daily report to the highway office on a special form, giving an hourly account of steam and air pressures, and of the boilers, engines and compressors that are in service. By this means the foreman of the highway department is kept in contact with the power service throughout the entire works, and knows exactly how the pressures are being maintained at every hour of the day. We have 108 engines, pumps and air compressors, with 8656 horse-power. All air compressors, dynamos for light and power and the engines running them are located in power houses, the other engines being located in the various shops.

The Time and Pay Departments.

As I have already stated, we employ 15,500 men, and to keep account of their time and wages is the work of our time department. Each man, on being hired, is given a number. The numbers for the men in each shop run in rotation. Each contractor has a piece work book, in which he keeps a daily account of the time and wages made by each man in his gang. The time of all day workers is kept in a day work time book by the time clerk. Once a week the time department takes the time records from the piece and day work books, entering the same on long printed sheets, giving the name and number of every man in each department. The piece work books are gone over, and charges against each locomotive are entered to its cost account. The account of the wages due each man is then turned over to the pay department.

The pay department has pay envelopes stamped with the name and number of every man in the entire works. The amount of wages due is stamped on each en-

velope. Our regular pay day, with the exception of holidays, is on Friday, and every Friday morning the money is brought from bank. It has always been our custom to pay in coin, which is easier to handle, and clerks are less liable to make mistakes. The amount stamped on each envelope is then put in, the envelope is sealed and all are arranged in rotation, as to number, in an upright position, in specially constructed racks, each rack holding about 200 envelopes. These racks when filled are put in safes built for this purpose, and are now ready for the paymasters. We have two pay stations—one at Broad street, in the erecting shop, and another at Seventeenth and Hamilton streets. At the signal to quit work on Friday night the men arrange themselves in long lines, according to number, at their respective pay stations, and at five minutes after six the line starts. We have eight paymasters, and run eight lines, the foreman of each shop, with his assistants, having charge of the lines his men are in. Each man as he passes the pay desk calls out his number to his foreman and his name to the paymaster, who passes him his envelope. It is possible in this way to pay our entire force in 30 minutes.

In conclusion, I will say that, to my mind, to get the best results from a shop you must have a unity of feeling among your men. Every man should be treated as a man, not as a machine. If a man comes to tell you about a supposed or a real wrong, he should be listened to and given the proper advice. Your superintendents and foremen should not be shut up in offices to which the ordinary workman cannot have access, but should be as get at able as possible. This is, and has been, the policy of the Baldwin Locomotive Works, and to this policy its success, I believe, may in a measure be attributed.

The Bethlehem Steel Corporation.

With the incorporation of the Bethlehem Steel Corporation last Saturday the final act of the reorganization of the United States Shipbuilding Company was performed. The new company was granted a certificate of incorporation under the laws of New Jersey, being capitalized at $30,000,000, which is divided equally between 7 per cent. noncumulative preferred and common stock. The charter is very broad, covering nearly everything but the maintenance of railroads or canals in the State of New Jersey. Sullivan & Cromwell, counsel for the Reorganization Committee of the United States Shipbuilding Company, issued a statement on Saturday, which says:

"The board of directors of the new company will consist of nine members, who have been selected in accordance with the plan of reorganization, as follows: George R. Sheldon, Thomas F. Ryan, John E. Borne, Pliny Fisk, C. M. Schwab, Edward McIlvaine, Archibald Johnston, C. W. Wetmore and Oliver Wrenn. The Reorganization Committee has purchased all of the properties of the United States Shipbuilding Company and the shares of stock of the Bethlehem Steel Company, and it is expected that the new company will be vested with the ownership of these properties within a few days.

"The plan of reorganization has been a very marked success, having been adopted by all of the holders of the collateral trust bonds covering the shares of stock of the Bethlehem Steel Company and by more than 98 per cent. of the holders of the United States Shipbuilding Company first mortgage bonds.

"Holders of the first mortgage bonds of the old United States Shipbuilding Company will receive $9,000,000 in preferred and $6,000,000 in common stock of the reorganized company for the trust company certificates certifying to their ownership of $15,000,000 old bonds. Practically all of the remaining shares of the new company, $6,000,000 preferred and $9,000,000 common stock, will go to Charles M. Schwab. It is understood that he will receive also more than 60 per cent. of the $3,000,000 new bonds in return for cash subscribed for reorganization purposes."

A New Plate Mill.—The United Engineering & Foundry Company, Pittsburgh, Pa., builder of rolls and rolling mill machinery of all kinds, has received a contract from the La Belle Iron Works, Steubenville, Ohio, for the building of an 84-inch plate mill, together with shears, table and other equipment. Contracts for the steel buildings to contain this mill have been placed with the Riter-Conley Mfg. Company, Pittsburgh, and the engine to drive it with Mackintosh, Hemphill & Co., Pittsburgh. This engine will be a Mackintosh-Hemphill Corliss, 44 x 60, with 24-foot fly wheel, weighing 50 tons. The engine will be of massive design, having large wearing surfaces, and will be specially built for rolling mill service.

PERSONAL.

J. D. Davis, one of the department superintendents at the works of the Westinghouse Air Brake Company, Wilmerding, Pa., has been appointed general superintendent of the plant, succeeding the late Harvey H. Welsh, Jr.

Robert E. Jennings, president of the Carpenter Steel Company, has been elected a director of the First National Bank of Jersey City, N. J.

W. J. Sando has been appointed manager of the Allis-Chalmers Company's pumping machinery department, with his headquarters in Milwaukee. Mr. Sando has filled many responsible places, both in private and public employ.

Charles H. Tucker, late active designer and assistant chief engineer with Pawling & Harnischfeger, Milwaukee, Wis., has accepted the position of chief engineer with the Case Mfg. Company, Columbus, Ohio, engineer, designer and builder of cranes and special machinery.

Pietro Redaelli, the manager of the steel works, wire mills and sheet plant of Giuseppe & Fratello Redaelli of Lecco, Lombardy, Italy, has returned home after a stay in this country.

Prof. Robert Simpson Woodward, dean of the School of Pure Science of Columbia University, New York City, has been elected president of the Carnegie Institution at Washington, D. C., in succession to Dr. Daniel C. Gilman, who has resigned that office.

Thomas Parrock has resigned his position as superintendent of the Brown-Bonell mills of the Republic Iron & Steel Company, Youngstown, Ohio.

George Evans of Pittsburgh has been appointed superintendent of the South Sharon sheet mills of the American Sheet & Tin Plate Company, South Sharon, Pa.

The Sharon Steel Works of the Carnegie Steel Company, Sharon, Pa., were started this week, after being idle for more than 18 months. A. A. Corey, formerly of the Homestead Steel Works, has been appointed superintendent of this plant. He is a brother of W. E. Corey, president of the United States Steel Corporation.

OBITUARY.

JOHN BERTRAM, president of the Bertram Engine Works Company, Toronto, Ontario, died November 28, after a lingering illness. He was born in Scotland 67 years ago and settled in Peterboro, Canada, in 1860, where he was engaged in the hardware business until moving to Toronto in 1878. Mr. Bertram served several terms in the Canadian House of Commons.

JOHN B. ANTHONY, for many years president of the Providence Tool Works and afterward treasurer of the Household Sewing Machine Company, Providence, R. I., died December 7, aged 75 years. He was a native of Fall River, Mass. He became treasurer of the Providence Tool Works when a young man, and on the death of his uncle, Richard Boardman, became the president of the corporation, holding the office until the company went out of existence, to be succeeded by the Household Sewing Machine Company. He remained as president of that company for some time, and resigned to become treasurer of the Cranston Print Works, which office he held until his death.

LEANDER M. DE LA MATER, for many years treasurer of the John Stephenson Car Works, Elizabeth, N. J., died suddenly of heart disease on December 12, aged 70 years.

New York.

NEW YORK, December 14, 1904.

Pig Iron.—The market is strong, with a fair tonnage of sales and some good inquiries for Foundry Irons and for Basic Pig. Prices are on the basis of $16.50, at furnace, for No. 2 X Foundry Iron, which is still about $1.50 below the importation point, the English market having kept ahead of our own in the advance. It is considered possible, however, that some Soft Irons may reach New England points before the spring. We note a sale of 6000 tons of 30 per cent. imported Spiegeleisen to an Eastern Steel company at private terms. There has also been considerable foreign Ferromanganese placed during the past few weeks at advancing prices.

Steel Rails.—At a meeting in Jersey City last Saturday the Steel Rail manufacturers decided to fix $28, at mill, as the price for Standard Rails for 1905 delivery. Thus far Eastern mills have not booked much business, the placing of an order by the Michigan Central Railroad being the only one of consequence. The Tennessee Company, which is carrying over considerable tonnage into the new year, is now supplied with orders from Southern roads to the full capacity up to July 1. There is an inquiry in the market for 75,000 tons from the Southern Railway Company. It has not yet been placed, but it is probable that by far the greater part of it will be awarded to the Tennessee Company, whose capacity is about 150,000 tons to 175,000 tons per annum. There has been an advance in the price of Light Steel Rails, on which the minimum is now $23, at mill. There has been a good deal of activity in this branch during the past few weeks.

Cast Iron Pipe.—Conditions are unchanged. Consumers are still placing orders for spring delivery at a rate never before known at this season. New York City will open bids on 2500 net tons on December 21. Carload lots are quoted at $26.50 per net ton for 6 to 10 inch, at tidewater.

Finished Iron and Steel.—The leading bridge interest reports a fair volume of business secured during the month of November, aggregating about 40,000 tons. A great deal of this work was composed of small lots. Orders now coming in are of the same character, with an occasional contract for a good quantity. Among the orders thus secured during the past week was one for 1500 tons from the Norfolk & Western Railroad Company. A Pittsburgh independent company was successful in securing the Boston Elevated contract, which will require about 9000 tons. This contract was taken at a very low figure. The bidders were numerous. A variation of practically 1c. per lb. was made between the highest and lowest bids. Quite a large number of inquiries are in hand from railroad companies, but the contracting parties do not seem very anxious to close. Nevertheless, the coming year is expected to be a very good one, as the improvements which are contemplated are in many instances imperative. The building trade is inclined to be quiet. Inquiries are much below those coming from railroad interests. The Plate trade continues in the same condition as before, with sales agents looking for better trade before the meeting on the 20th, when prices are expected to be advanced. The Bar Iron trade continues in good shape, but the demand is less active, which is partly ascribed to the great discrepancy between Bar Iron and Bar Steel prices. Quotations at tidewater are as follows: Beams, Channels, Angles and Zees, 1.54½c. to 1.80c.; Tees, 1.59½c. to 1.80c.; Bulb Angles and Deck Beams, 1.64½c. to 1.85c.; Sheared Plates, in carload lots, 1.54½c. to 1.65c. for Tank, 1.64½c. to 1.80c. for Flange, 1.74½c. to 1.90c. for Marine, and 1.74½c. to 2.50c. for Fire Box, according to specifications; Refined Bar Iron, 1.64½c.; Soft Steel Bars, 1.44½c. to 1.50c.

Old Material.—Dealers report a very good demand, especially for Steel Melting Scrap and Cast Scrap. Heavy sales have been made of Steel Scrap for delivery at Western works. More large inquiries are in the market for the same class of material, and it would appear that Eastern users of Steel Scrap may be put to some difficulty in securing supplies for a few months, in view of the diversion of so much tonnage from this market to the West. While the heavy and very general fall of snow will cause many kinds of rolling mill Scrap to be scarce, dealers are disposed to believe that this may be offset by a diminished demand from Bar Iron mills, whose business is likely to be reduced unless the prices of Steel Bars are advanced to about the same level. Prices per gross ton in New York and vicinity are approximately as follows:

Old Iron Rails	$20.00 to $21.00
Old Steel Rails, rerolling lengths	15.50 to 16.50
Old Steel Rails, short pieces	14.50 to 15.50
Relaying Rails	20.00 to 21.00
Old Car Wheels	15.00 to 16.00
Old Iron Car Axles	21.00 to 22.00
Old Steel Car Axles	18.00 to 19.00
Heavy Steel Scrap	14.50 to 15.50
No. 1 Railroad Wrought Scrap	18.00 to 19.00
No. 1 Yard Wrought Scrap	16.50 to 17.00
Iron Track Scrap	16.00 to 17.00
Wrought Pipe	13.50 to 14.00
Ordinary Light Iron	10.00 to 11.00
Cast Borings	7.50 to 8.50
Wrought Turnings	9.50 to 10.50
No. 1 Machinery Cast	14.00 to 15.00
Stove Plate	11.00 to 12.00

Metal Market.

NEW YORK, December 14, 1904.

Pig Tin.—All interest has been centered in the doings of the London market doing the week under review, and prices here have followed the fluctuations in London in a half hearted sort of way, but on the whole there was very little active interest taken in the metal on this side. Consumers are buying only from hand to mouth, apparently awaiting future developments. The trend of affairs in London has indicated that the market there is pretty well under control so far as spot is concerned. The price of spot in London has been steadily advanced, and to-day there was apparently a squeeze which sent the quotations up to £136, while futures remained sluggish at £130 5s. The price of the latter, it will be noted, is lower than it was last week, and represents the actual cost of importation from the Straits. The heavy premium asked for spot, which, it will be observed, is now £5 15s., gained £1 15s. in to-day's manipulations. Prices quoted here to-day are 29.10c. to 29.60c. for spot and 28.75c. to 29.12½c. for futures. These are just a shade lower than the quotations of last week. Thus far this month the arrivals amount to 927 tons, while about 2470 tons are afloat.

Copper.—While prices remain nominally unchanged, it is pretty well known in the trade that in many cases they are being shaded and that the tone of the market has really weakened considerably since our last writing. The present prices are, therefore, entirely nominal. Business has been very quiet, indeed, and those interested in Copper appear to have stood back awaiting developments in connection with the sensational doings concerning the Copper share market. Some resales of Electrolytic were rather prominent in the market during the week at figures ranging from ¼c. to ½c. below the official prices. The nominal quotations to-day are as follows: Lake, 14.87½c. to 15.12½c.; Electrolytic, 14.75c. to 15c., and Casting, 14.50c. to 14.75c. The London market to-day closed at £66 for spot and £66 5s. for futures. Best Selected is 5 shillings lower than it was last week, with £69 15s. The exports thus far this month aggregate 7088 tons. It is felt in the trade that it would not be wise to predict this month's shipments at present, as there may be some delay in the arrival of steamers.

Pig Lead.—Demand for Lead is moderate, but spot supplies and offerings from the West being still light serve to keep prices firm at last week's figures. Spot Lead in New York is quoted at 4.60c. to 4.70c. The St. Louis market has advanced a shade and was quoted to-day at 4.55c. to 4.62½c., according to brand. The London market was quoted at £12 17s. 6d. The American Smelting & Refining Company has not changed its quotation, which is still on the basis of 4.60c. for "shipment" Desilverized in 50-ton lots.

Spelter—Is quiet and nominal, with very little of interest in the market. Spot Spelter was quoted to-day at 5.75c. to 5.87½c. The St. Louis market has stiffened again and is quoted at 5.70c. London cables show a slight decline, quoting £24 17s. 6d.

Antimony.—The demand for Antimony has fallen off to some extent and the market is easier in tone, although unchanged as to price. Cookson's was quoted to-day at 9.25c. to 9.75c.; Hallett's at 9c. to 9.50c., and other grades at 8c. to 8.50c.

Nickel.—About the usual amount of business is noted. Prices are quoted for large lots at 40c. to 45c., with smaller quantities ruling at 50c. to 60c.

Quicksilver.—The market remains firm and unchanged, flasks of 75 lbs. being quoted at $40. The London price is unchanged at £7 15s.

Tin Plate.—Prompt shipments are still reported to be somewhat difficult to secure from the mills, and some of the makers are obtaining premiums of 5c. to 10c. per box on spot Plates. No actual change in quotation has been made as yet, however. The American Sheet & Tin Plate Company quotes $3.64 per box, f.o.b. New York, for 14 x 20 100-lb. Coke Plates, or $3.45, f.o.b. Pittsburgh. The Welsh market has gone up 1½ pence, to 12 shillings 6 pence, f.o.b. Swansea.

We are indebted to L. Vogelstein, American representative of Aron Hirsch & Sohn, Halberstadt, Germany, for the following figures of the German consumption of foreign Copper for the months of January to October, 1904, compared with the same period of time for 1903 and 1902:

	1904.—Tons.	1903.—Tons.	1902.—Tons.
Imports	95,797	70,958	68,815
Exports	7,309	8,477	7,516

Out of the above 80,693 tons were imported from the United States.

HARDWARE.

IT is gratifying to the opponents of the Parcels Post, in the unreasonable and mischievous form in which its establishment has been proposed, to observe indications on the part of those in official responsibility of a disposition to move in the matter, if at all, with the utmost conservatism and a due regard for public as well as private interests. In this condition of affairs there is renewed evidence of the good results of the agitation against the Parcels Post which was conducted with so much energy by the retail Hardware associations a year or two ago.

Although the President is silent on the topic of Parcels Post in his recent message to Congress, there is a paragraph elsewhere in it which applies indirectly to that measure, as it condemns anything that will tend to deprive the small merchant of his livelihood. This paragraph reads as follows:

> "The farmers, the mechanics, the skilled and unskilled laborers, the small shopkeepers, make up the bulk of the population of any country; and upon their well being, generation after generation, the well being of the country and the race depends. Rapid development in wealth and industrial leadership is a good thing, but only if it goes hand in hand with improvement, and not deterioration, physical and moral. The overcrowding of cities and the draining of country districts are unhealthy and even dangerous symptoms in our modern life."

The very fact, also, that the President makes no mention of Parcels Post may be taken as an encouraging sign, as he devotes much space to postal affairs, particularly to the rural free delivery systems.

Equally significant is the recommendation of the Postmaster-General, especially as the action he suggests avoids the great objections which hold against a system of Parcels Post which would distribute merchandise in all parts of the country regardless of the cost of such distribution. His recommendation relates to improvement in rural free delivery, which if carried into effect will open another channel of cheap and quick delivery of goods from the Hardware merchant to his customers in the suburbs. The recommendation is that "Congress fix a rate of three cents a pound or any fractional part thereof on packages not exceeding five pounds mailed at the distributing post office of any rural free delivery route for delivery to a patron on that route, this to apply only to packages deposited at the local post office for delivery to patrons on routes emanating from that office, and not to mail transmitted from one office to another." Such a system of parcel delivery would be cheaper than the express rates charged by the trolley companies that handle express matter, which would be an advantage where small parcels are handled on routes traversed by trolley lines. But the great gain would be in districts removed from the electric railways, and there are a great many such rural free delivery routes. The increasing extension of the rural telephone has created a demand for this class of parcel delivery, which can be done cheaply, the Postmaster-General points out, because there is no expense for railroad transportation and because the system by which such parcels would be delivered is already established. If there be any objection to such a plan it is that the system might be the opening wedge for a general parcel delivery that would cause general injury to retail trade by fostering the catalogue houses and be in many ways open to grave objection. In itself the measure proposed has certainly many advantages, and if the plan is adopted would give local merchants increased facilities for serving efficiently the trade in their territory, and enable them more successfully to compete with the catalogue houses.

Condition of Trade.

In sympathy with the upward course of prices in the Iron market and the strong and aggressive tone which characterizes it there are a number of advances in the Hardware field and a very steady and firm feeling prevails. The announcement of higher prices for Wire Nails and Wire was anticipated by the trade, but their formal promulgation gives added strength to the market, calling attention in the most prominent way to the conditions which exist. There are also, it will be noted, several minor advances, but in general it may be said that there is at the present moment less tendency than a week or two ago to make finished products follow closely the increased cost of the raw material. This is not in any sense an indication of a reaction in the market, but the advances already announced cover the lines most immediately affected, and others are, owing to conservatism on the part of manufacturers, being held in abeyance a while, as there is a desire to avoid anything in the way of premature advances which might not be justified in case the present anticipations in regard to the price of Iron and the volume of general business should not prove to be well founded. The first of January, too, is regarded as a natural time to make known changes in price, and the indications point to a revision of quotations at the turn of the year to a greater extent than has lately been the case. Meanwhile manufacturers are in an unobstrusive way calling in extreme discounts and withdrawing unusual concessions, and at the same time refusing in some lines to accept future orders at present terms. The spirit which thus prevails is, while reasonably conservative, decidedly hopeful and confident, and arrangements are being made by manufacturers and merchants alike for active business in 1905. While both the producers and distributers of goods are thus studying the situation closely, and many of them placing orders to cover future needs, the matters connected with the administration of store and factory—the ascertaining of the results of the year's business, preparation for next season in the revision of methods and modification of plans, and not infrequently enlargement of enterprise—naturally call for a good deal of thought and attention, which tend to make the month a busy one and its work important.

Chicago.

Another dollar a ton tacked onto the Wire schedule last week is by many taken as a prophecy of the early return of the $2 Nail schedule that ruled the greater part of last year, if, indeed, it will stop there—that is, of course, provided inflation is not carried to the bursting point. Galvanized Sheets have also been advanced $2 a ton and Black Sheets are strong. Coal Hods are about 10 per cent. higher than last week, and Tinware is slated for an early advance, several makers having withdrawn from the market. Rope has advanced, Common Sisal being now quoted to Chicago jobbers at 8¼ cents in car lots, Pure Sisal at 10¼ cents, Common Manila at 12 cents, Pure Manila, 12½ cents. Jobbers' asking prices are ½ cent higher. The International Harvester Company has departed from its usual custom of withholding Twine prices until late in the spring, and last week announced its schedule, published elsewhere in these columns, declining, however, to guarantee prices as usual. The announced prices are extremely low as compared with the present price of fiber and show an indication

that the leading factor intends to make competition unprofitable. General Hardware business is good in nearly all lines, though the trade is watching apprehensively the long continued drought. Refrigerator makers have had another bad year and a large quantity of their product will be carried over into next year. This, coupled with the rapidly advancing prices on Zinc, Galvanized Iron, Hardware, pine, hard wood and, in fact, practically all the materials that enter into the manufacture of Refrigerators, is giving rise to a spirit of hesitation among the makers. As soon as there is any guarantee that present prices or still higher ones will be maintained this feeling of uncertainty will give way to one of satisfaction, because the increased value of goods on hand will in a measure at least pay for the cost of carrying over and will justify higher prices all along the line.

St. Louis.

NORVELL-SHAPLEIGH HARDWARE COMPANY.—At 12 o'clock midnight Thursday, December 1, at the foot of the Louisiana Monument, President Francis said: "Farewell, a long farewell, to all thy splendors." He pressed an electric button and immediately the brilliant illumination faded into darkness. The Louisiana Purchase Exhibition was history.

A few facts in regard to the World's Fair awards may be of interest to the Hardware trade: Awards were not competitive in the sense that only one exhibitor of a certain line of goods could obtain, for instance, a gold medal. It was a common thing for the juries to award a number of gold medals to exhibits of exactly the same kind of goods. Each class of goods stood on its own merits, regardless of the awards made to its competitors. The character of the installation and the manner in which the goods were displayed and shown had great weight with the juries. Medals were not given by the Exposition company. The winners of such medals had the privilege of paying for them at certain fixed rates. The highest award of all was the grand prize. It was represented by a double gold medal. Other awards consisted of gold, silver and bronze medals, respectively. Grand prizes as a rule were only awarded to very extensive exhibits.

In the division of manufactures none but manufacturers were permitted to compete for prizes. It was ruled by the chief of the department of manufactures, however, that any concern having the exclusive sale or which purchased the entire output of a certain manufacturer had the right to exhibit its goods and to be classed as a manufacturer of that line. It was also ruled that those who assemble parts were manufacturers. For instance, if any one purchased Axes, Handles and Wedges, handled the Axe and drove in the Wedge, he could be classed as a manufacturer of handled Axes. It was also ruled that any exhibitor who, according to the above ruling, was a manufacturer of any one article in the general line he exhibited and who received a reward of a gold medal on this one article could without impropriety advertise his entire line as having received the award, regardless of whether this exhibitor manufactured more than one item in this whole line. In other words, if exhibitors would get themselves classed as manufacturers on one item they could receive the award on all their exhibits, regardless of whether they manufactured all the other items or not.

The above rulings by the chief of department of manfactures will answer a good many questions that have been asked on this subject by manufacturers and others. A point manufacturers who may desire to make exhibits at further expositions should bear in mind is that the size and importance of their installation have much weight with Exposition officials in the awarding of high prizes. For instance, a small exhibit of goods of unusual merit in themselves might be largely overshadowed by a more pretentious exhibit, in which the quality of the goods might not be any better or as good as that in the smaller exhibit. Several manufacturers expressed regret to the writer that they were not aware of this fact, and stated that, if they had known such to be the case, they would have prepared more extensive exhibits. A moment's thought must make it obvious that those in charge of the Exhibition in this manner encourage imposing exhibits for the sake of the Exposition itself.

Baltimore.

CARLIN & FULTON.—While according to the calendar the end of the year is drawing near, business keeps up remarkably well, partly on account of actual demand for daily consumption and partly in anticipation of higher prices. From all indications there are excellent grounds for such expectations, as we are daily receiving notices of the withdrawal of outstanding quotations and the announcement of new and higher figures. Higher prices for raw material and for labor also, with an extraordinary demand from all over the country, and also the annual congestion of railroad traffic, make it easy for the manufacturers to stimulate orders, and a few more advances will, we think, cause a stampede of buyers to get under cover.

While there has been within the last few days quite a slump in the market price of cotton, resulting from the Government report of an enormous crop, still the general agricultural conditions throughout the country are such that the country can stand some concession in prices without interruption to business. As we have written before, we believe that the prosperity of the agricultural sections is the basis for the business activity of the nation, and one has only to read the recent report of Secretary Wilson to find the reason why the year 1905 should be one of continued prosperity in all lines of trade.

According to his report, the total value of farm products for the year 1904 amounted to $4,900,000,000. He states that in two years the wealth produced by agriculture exceeded the total output of all the gold mines of this world since the discovery of this continent by Christopher Columbus. He also states that our agricultural products of 1904 exceeded in value six times the total capital stock of all the national banks in the United States, that the corn crop alone is in excess of the total national debt, and that the cotton crop of 1904 amounted to $600,000,000. We can also see a good reason for the great demand for Poultry Netting when we read in this report that the value of eggs laid by hens in the United States in one month would pay the whole year's interest on the national debt.

With these facts before us how could we expect anything else than a good business for some time to come?

Louisville.

BELKNAP HARDWARE & MFG. COMPANY.—The market continues to show unquestionable signs of strength, and this is based not on the belief of what is going to happen, but from orders actually upon the manufacturers' order books. There has never been a time, we take it, when there has been more actual, substantial business to proceed on than at present; in fact, the manufacturers say that they are almost afraid to let be known the volume of business which they have entered for the first half of next year.

The drop in the price of cotton is, of course, disturbing to the South, but fortunately this year a great deal of it had been marketed at pretty full prices before the last slump came, and those mills and factories which had been doing without this great staple can now afford to replenish their stock. We shall expect to hear of spindles and looms being set in motion which have been kept idle for the past year by the very reason of the prohibitive prices.

One peculiar phase of false economic reasoning is given out in to-day's papers—namely, that certain planters or holders in the South are willing to contribute their share to make up a million bales of cotton, which is to be burned in order to produce artificial scarcity and thus raise the price or prevent its further fall. Surely the schoolmaster is needed in these parts, that such reasoning might be set at naught. The idea of wiping out just so much wealth, hoping to make somebody richer thereby, is a queer proposition in this age of the world's progress.

The violent fluctuations in Wall Street must be more or less disturbing to those gentlemen who are listening to the ticker or watching the tape, but they are not cutting much figure with the great masses of the people, who are

earning a good daily wage and who are our best and greatest customers after all.

Cleveland.

THE W. BINGHAM COMPANY.—A very satisfactory business in the Hardware line is coming to the Cleveland jobbers, perhaps because they carry such a large and varied line of all kinds of Hardware, House Furnishings, Mining, Milling and Manufacturers' Supplies. Just at present we are enjoying a splendid trade in holiday goods; a great many orders going forward by freight with other goods, also by express to our customers, showing that many of them are working up their Christmas trade and are replenishing or sorting up their stocks again with such holiday goods as Carpet Sweepers, Children's Express Wagons, Enameled and Planished Coffee and Tea Pots, Tool Chests, Chafing Dishes, Baking Dishes, Fancy Trays and Waiters, Pocket and Table Cutlery, Scissors, Shears and Razors. Money is plentiful throughout the land, and all indications point to a much larger trade in Christmas goods this year than in former years.

The manufacturers have advanced the price of Wire Nails and Plain and Barbed Fence Wire $1 a ton. The advance in raw material, the continued good pay to artisans and the short working hours demanded make the manufacturers stop and think what it will cost to make goods nowadays, and we look for an advance in many kinds of Shelf Hardware, especially in Strap Hinges, Butts, Bolts, Wire Cloth, Netting, Screws, Carpenters' Tools, Brass and Iron Gas and Steam Fittings. We believe customers would do well to look over their stocks at once and sort up pretty liberally, as indications are that we are going to have a splendid trade and prosperous times the coming year.

Our advice to the trade is not to overbuy, but buy your legitimate wants. Be sure to keep your whole stock well assorted. Trade nowadays is not confined to any one particular line, but all kinds of Hardware are being used and are in good demand. If you have not placed your order for Screen Doors and Windows, Ice Cream Freezers, Lawn Mowers, Shovels and Spades, Steel Goods and kindred lines with parties who are able to furnish you promptly in the spring with the kinds you usually sell, you had better do so at once. The man who keeps his stock well assorted and keeps his goods passing over the counter is the one who makes the money nowadays. "It is the nimble shilling that brings us a profit and makes us rich, not the talent tied up in a napkin."

Nashville.

GRAY & DUDLEY HARDWARE COMPANY.—We are pleased to report that the volume of business continues to be very large. Sales are running considerably ahead of last December. Sales of holiday goods have been enormous, and there will be practically nothing left of these goods after Christmas.

The recent advance in Iron, Steel, Nails and other metal products has had a most healthy effect upon the market. These advances are all being well maintained.

Retail dealers are buying freely, and not only placing liberal orders for immediate shipment, but are entering large orders for future shipment. In this section the spring trade generally opens January 1, but it seems to be ahead of time this year, and the jobbers are already taking some handsome spring orders.

Prospects for business during the early part of 1905 seem to be very bright, and the only cloud upon the sky of the Southern merchant at this time is the severe decline in the price of cotton. The price of this commodity is down almost to the cost of production. We are afraid that this will possibly have a depressing effect upon the spring trade, and it may also curtail collections; but at the present writing it has not produced any material difference. People who make a study of this question and are posted seem to think there will be a decided reaction, and we can only hope that their predictions will come true.

We wish to take this opportunity to extend to the editors, publishers and readers of *The Iron Age* a Merry Christmas and a Happy and Prosperous New Year.

Philadelphia.

SUPPLEE HARDWARE COMPANY.—The volume of business continues good, and the year 1904 comes down the home stretch at a pace which promises to make it a winner, despite the fact that it lagged somewhat during the second quarter.

A spirit of confidence is manifested by merchants all over the country, and the seasonable weather, together with the generally enhanced value of merchandise, is undoubtedly responsible for the more than usually generous specifications that jobbers are receiving at this time of year.

Our experience with collections would lead us to believe that prosperity is very generally distributed throughout the Hardware trade, and, despite the frenzied finance of Wall Street, the steady plodding of merchants who deal in such tangible values as those offered by our ancient and honored craft is bearing fruit and adding a very comfortable surplus to the nation's wealth.

The prospect for an active spring business is more than assured, and experienced merchants are taking time by the forelock and laying in a liberal stock for the demand that seems sure to come.

St. Paul.

FARWELL, OZMUN, KIRK & CO.—Winter has held off remarkably, and the demand for Hardware has continued later than usual in December. The Northwest has been sharing to some extent with the country south and east of us in the absence of the usual fall rains, though this condition did not begin to exist early enough to affect the crops, nor has it been so severe as to cause serious inconvenience or loss. Indeed, the weather has been so favorable for outdoor work that the farmers have saved their crops, have done a large amount of fall plowing and are also doing extensive work on repairs preparatory to winter. This makes a demand for many articles of Hardware, and helps materially to swell the sales at this usually dull season. Salesmen are still busy, and will continue actively at work till Christmas, unless the weather conditions greatly change.

The stiffening up of prices that has been evident for some time is appreciated by the trade. It would be unfortunate for this tendency to grow to such extent as to foster largely speculation, but there is very little danger of this result, and a strong market, with the indications favoring moderate advances, is heartily welcomed. It now appears reasonably certain that for some time to come a firm, active market for Hardware in general may be expected, and the few manufacturers whose business is now not adjusted on this footing, it would seem ought to be trying hard to get there. On the other hand, the manufacturers of some lines should see that the advances already made by them are all that the market will stand, and that further advances would certainly be unwise.

Stocks in hands of retail dealers are not large, and the jobbers will be called on to meet the current demands, so that when the spring trade opens there will probably be a full normal business.

The general conditions of trade promise at least the usual amount of activity for the new year, and the Northwest hopes to share in it. Some territory has been crippled temporarily by loss of part of the wheat crop by rust, but it is seldom that we have a year with fewer bad spots showing up from short crops than 1904 is leaving behind it.

Collections are up to average, and the outstanding accounts will generally be a little less than those of last year.

Portland, Oregon.

CORBETT, FAILING & ROBERTSON.—If there was any life to trade we should be doing business in the Pacific Northwest, as the weather to date has favored building operations and farm work as never before at this season of the year. There is a hoodoo out somewhere, and until we can get hold of and strangle it there is no use kicking. We will have to bide our time and wait until the clouds roll by.

This section of the country has covered far into the coming year in its purchase of lines that past experience has taught us are selling below or close to manufacturer's cost. We welcome every advance as it is announced, and trust advances so far made are but forerunners of more radical advances yet to come.

We shall be in condition to do business when it offers in the new year, at least so far as ample stocks in hand are concerned. The only question at present is, Will the demand develop with the new year? Collections do not improve as they should at this time; in fact, more are begging off and asking additional accommodation than earlier in the season.

New Orleans.

A. BALDWIN & CO.—For the past thirty days business in this section has been exceptionally satisfactory, but recently, owing to the slump in the price of cotton, country merchants are beginning to hold off their purchases and the same activity does not prevail. We, however, look for considerable improvement after the new year.

NOTES ON PRICES.

Wire Nails.—The anticipated advance of 5 cents per 100 pounds was made by the American Steel & Wire Company on December 8 in the price of Wire Nails and Wire products, to take effect on that date. Contracts will be entered for delivery within 60 days from date of same for definite quantities only. Demand continues large, while the tone of the market is very firm, as some of the larger independent mills had previously advanced the price to $1.75 base. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Carload lots	$1.75
Less than carload lots	1.80

New York.—Owing to unfavorable weather for out of door work, the demand for small lots from store has fallen off somewhat during the past week. Business in larger quantities has been excellent so far this month up to the 8th inst., when the advance of 5 cents per keg took place. The advance is charged quite generally by local jobbers. New York quotations are as follows: Single carloads, $1.94½; small lots from store, $2.

Chicago.—An advance of $1 a ton was made last week too late for this report. This makes the new Pittsburgh base price $1.75 per 100 pounds, or $1.90, Chicago, to jobbers or large retailers in car lots, with 5 cents advance for less than car lots, from mill. The buying movement is comparatively light, owing to the end of the year inventories, but it is good compared with previous years.

Pittsburgh.—On Thursday, December 8, the American Steel & Wire Company made the generally expected advance of 5 cents per keg in the price of Wire Nails effective from that date. This advance had been made several weeks previous by some of the larger independent mills, and the price of $1.75 per keg base now represents the general market. The mills continue to enter contracts for shipment within 60 days from date of contract. Demand continues large and the tone of the market is very firm. We have advanced prices 5 cents per keg, and now quote Wire Nails in carloads to either jobbers or retailers at $1.75, and in less than carloads at $1.80 f.o.b. Pittsburgh, terms 60 days, or 2 per cent. off for cash in 10 days.

Cut Nails.—The Cut Nail Association, pursuing the course it had previously determined upon of keeping Cut Nails on a par in price with Wire Nails, an advance of 5 cents per 100 pounds went into effect on December 8. It is understood that one of the mills outside of the association will not accept orders for carload lots for less than $1.80 base, which is 5 cents more than the present association price. Another mill is reported as being sold up and not accepting further orders. Demand has been active in anticipation of an advance. Quotations are as follows: Carload lots, $1.75; less than carload lots to jobbers, $1.80, and to retailers, $1.90, f.o.b. Pittsburgh. Iron Cut Nails for delivery at Pittsburgh, Buffalo and all points west of these cities, 10 cents advance per keg on Steel Nails. The meeting of the Cut Nail Association was postponed from the 8th to the 14th inst., at which meeting the advance in price, which took place on the 8th inst., was reaffirmed.

New York.—An advance of 5 cents per 100 pounds was made in the price of Nails by the Cut Nail Association on December 8, and the advance is generally charged by local jobbers. Demand is satisfactory for the season. New York quotations are as follows: Carloads on dock, $1.89; less than carloads on dock, $1.94; small lots from store, $2.

Chicago.—The makers of Cut Nails have advanced their prices 5 cents, in line with the advance in Wire Nails. This makes the Chicago price on Steel Nails $1.90 in car lots and $1.95 in smaller lots, with 5 cents higher for Iron Nails.

Pittsburgh.—The meeting of the Cut Nail Manufacturers' Association, scheduled for the 8th inst., was postponed to December 14, but by prearrangement the price of Steel Cut Nails followed the advance made in Wire Nails, and was made $1.80 per keg. Most of the mills are understood to be pretty well sold up. Demand has been active, the trade placing liberal orders in view of the expected advance in prices. We quote as follows: Carloads, $1.75, base; less than carloads to jobbers, $1.80, base; less than carloads to retailers, $1.90, base, plus carload rate of freight to point of delivery, terms 60 days, less 2 per cent. off for cash in 10 days. Iron Cut Nails for delivery at Pittsburgh, Buffalo and all points west of these cities are 5 cents a keg higher than above prices.

Barb Wire.—On December 8, and effective on that date, the American Steel & Wire Company advanced the price of Barb Wire 5 cents per 100 pounds. A similar advance had been previously made by several of the larger independent mills. In anticipation of the advance liberal orders have been placed with the mills. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carload lots	$1.90	$2.20
Retailers, carload lots	1.95	2.25
Retailers, less than carload lots	2.05	2.35

Chicago.—Heavy snowfalls have interfered greatly with the active work of stringing Wire Fence, but the season has been favorable up to so late a date that there is but little pause between fall and spring trade. Indeed, spring demand is unusually active for this time of year, in anticipation of further advances. Last week's advance of 5 cents makes present prices at Chicago: Jobbers, in car lots, Painted Wire, $2.05; Galvanized, $2.35; retailers, car lots, 5 cents higher; less than car lots, $2.20 Painted; $2.50 Galvanized. Staples, Bright, $2; Galvanized, $2.30.

Pittsburgh.—On December 8 the American Steel & Wire Company advanced prices $1 a ton. These advances had been made several weeks ago by several of the larger independent mills. Demand has been very active, the trade placing good sized orders in the belief that prices would advance, which has been the case. We have advanced prices $1 a ton and now quote as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carload lots	$1.90	$2.20
Retailers, carload lots	1.95	2.25
Retailers, less than carload lots	2.05	2.35

Smooth Fence Wire.—An advance of 5 cents per 100 pounds in the price of Annealed Wire was made by the American Steel & Wire Company on December 8, the advance taking effect on that date. A large volume of business has been placed with the mills in anticipation that prices would be advanced. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent discount for cash in 10 days:

Jobbers, carloads	$1.60
Retailers, carloads	1.65

The above prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

	6 to 9	10	11	12&12½	13	14	15	16
Annealed	Base.	$0.05	.10	.15	.25	.35	.45	.55
Galvanized	$0.30	.35	.40	.45	.55	.65	1.05	1.15

Polished Fence Staples have been advanced, in carload lots, to $1.85, and Galvanized to $2.15 per 100 pounds.

Chicago.—The new prices promulgated last week are as follows: Base sizes 6 to 9, annealed, $1.75 in car lots to jobbers, and $1.80 to retailers. Galvanized Wire 30 cents extra. Less than car lot orders from mill usually 5 cents extra.

Pittsburgh.—As outlined in this report last week, the American Steel & Wire Company has advanced prices of Wire $1 a ton, effective from December 8. The mills continue the policy of booking contracts for shipment within 60 days from date of order. The market is firm and tonnage is quite satisfactory for this season of the year. We have advanced prices $1 a ton, and now quote as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads	$1.60
Retailers, carloads	1.65

Woven Wire Fencing.—An advance has been made by the leading producers in the price of Woven Wire Fencing from $1.50 to $2 per ton, by reducing discounts one point.

Registers.—The manufacturers of Registers are announcing higher prices and the market is represented in a general way by the following discounts:

Japanned, Bronzed and Electroplated	70 and 10 to 75 %
White Porcelain Enameled	60 %
Solid Brass and Bronze Metal	50 %

Beyond these prices discounts are given for quantities.

Tinware and Galvanized Ware.—Prices on household goods in the way of Tinware and Galvanized Ware were advanced December 6 by general agreement among the manufacturers, owing to increases in the price of sheets. So far the changes have been mainly in connection with Tinware, Stamped; such grades as are largely made by machinery, with only a moderate amount of hand work. These advances average approximately 5 per cent., although some goods show 7½ to 10 per cent. increase. The opinion is expressed that with further advances in the raw material other increases will have to be made in the finished product.

Cotton Sash Cord.—Some of the manufacturers have adopted a new base price on Cotton Sash Cord of 22 cents per pound for Nos. 8 to 12, with an advance per pound of ½ cent for No. 7 and 1½ cents for No. 6. The cause of the advance is attributed to the scarcity of the goods.

Pump Chain.—As a result of the increased cost of Wire and Spelter, the manufacturers of Pump Chain have made an advance in their prices, the regular quotation on barrel lots being 5¼ cents per pound, which is an advance of 1 cent per pound on the price in ton lots.

Screws, Set and Cap.—This is one of the lines in which low prices are still prevailing and little improvement is to be noted. This condition of things is the result of the active competition which prevails.

Wringers.—In connection with an attractive catalogue recently issued, Lovell Mfg. Company, Erie, Pa., announce revised list prices, which are issued in a separate list and discount sheet, and are subject to a discount of 50 per cent. in dozen lots. A large and attractive line is thus brought to the attention of the trade.

Coil Chain, Trace Chain, &c.—In accordance with the intimation given in our last issue, the manufacturers of Chain, Trace, Coil, &c., are generally announcing higher prices. As a result of the condition of the market in the raw material and the active demand prices in this line are decidedly firm and are regarded as having still an upward tendency.

Copper Rivets and Burrs.—The course of things in the Copper market is having its effect upon Copper Rivets and Burrs, which are quoted at still higher prices than those which have recently been announced. The goods may be quoted in a general way at a discount of 50 and 10 to 60 per cent., the latter figure being the price for large lots.

Binder Twine.—The International Harvester Company of America has announced prices on its Binder Twine for the season of 1905, which are as follows:

	Per lb.
Sisal	9½c.
Standard	9½c.
Standard Manila (550 feet)	10½c.
Manila (600 feet)	11½c.
Pure Manila (650 feet)	12½c.

Five-ton lots, ⅛ cent less; carload lots, ¼ cent less. Chicago delivery, usual terms of payment. Kansas City, Omaha, Council Bluffs and Minneapolis, ¼ cent added. Prices not guaranteed. Allowing for freight, New York prices would be ¼ cent lower than the above. Prices for 1904 were not announced until April 15, while those for 1903 were not issued until March 30. Prices for the last two years were guaranteed, but for the coming year no guarantee will be given. The demand for an earlier announcement of prices has come from a large number of dealers, including many of the company's agents, who were of the opinion that the delay in giving out prices interfered with dealers in securing orders for Twine. In comparison with the opening prices of 1904, the new schedule represents a reduction of ¾ cent on all grades. In the new prices, taking the small lot price as a basis, Sisal and Standard Twine are a shade cheaper than Manila grades, while last year the intrinsic values were the same. The new prices have probably been based on the average cost of fiber to date, as the prices of both Manila and Sisal fibers have steadily advanced during the past month. In November the St. Louis Cordage Company, St. Louis, Mo., distributed a circular stating that it would sell Sisal or Standard Twine for the purchaser's usual requirements at 9¾ cents per pounds, delivered at purchaser's railroad station, payable by note due October 1, 1905, the price being guaranteed against its own prices to May 1, or to date of shipment, if shipment be made prior to that date. The St. Louis Cordage Company has now advanced its price ¼ cent per pound.

Rope.—Demand is light and is not expected to improve until after the first of the year. Under these conditions it is possible that the higher prices, which were recently announced, are not adhered to in all cases, and that what was understood to be the minimum prices to the largest buyers are sometimes made to the smaller trade to secure orders. No change has been made in card prices, which are as follows: Pure Manila, 12½ cents; mixed Manila, 10 to 11¼ cents; pure Sisal, 10 cents; mixed Sisal, 8½ cents per pound.

Window Glass.—Demand appears to keep up throughout the country, with no indications of any immediate change. There is a difference of opinion expressed by those who estimate the capacity in operation, ranging in pots from 1600 to 1950, not including the American Window Glass Company's production. The former number is regarded as insufficient to supply the demand until September, 1905, while the latter number, supplemented by additional capacity which is expected to be added, would seem sufficient to avert a Glass famine. New York quotations are as follows: First two brackets, single, 90 and 15 per cent. discount; larger sizes, single and all double strength, 90 and 5 per cent. discount, all from jobbers' list of October 1, 1903.

Paints and Colors.—*Leads.*—The demand for White Lead in Oil has kept up unusually well for the past few weeks, inside work being the chief cause of activity. No advance has been made in price for about a year, while prices for Pig Lead have been both lower and higher since that time. Upon the future supply and demand of the raw material, and the consequent course pursued by the smelters, will probably depend the price of the finished product during the coming year. While quotations of some manufacturers of White Lead in Oil are from 6½ to 7 cents per pound, according to quantity, some brands are obtainable at 6¼ cents and upward, according to quantity and terms of sale.

Oils.—*Linseed Oil.*—Weather conditions are unfavorable for an active demand, and orders are only for such quantities as are required for immediate necessities. Since the close of lake navigation the price of Seed has advanced 4 to 5 cents per bushel, but no corresponding advance has been made in the price of Oil. One crusher states that there is not enough demand to justify ad-

vancing prices. Crushers appear to have plenty of Oil on hand, as they insist upon purchasers taking Oil for which they have contracted. Prices for State and Western Oil are 40 to 41 cents for Raw, according to quantity. City Raw, in lots of five barrels or more, is quoted at 41 cents, and in less than five barrels at 42 cents per gallon. The market appears firm at these figures.

Spirits Turpentine.—Demand in this market is of a hand to mouth character, buyers showing little interest in the market. Speculative manipulations by large interests in the South are said to be responsible for rapid fluctuations, not warranted by supply and demand. The estimated production of Turpentine for the coming season is understood to be unusually large, which if not curtailed will naturally cause lower prices. Quotations in New York, according to quantity, are as follows: Oil barrels, 50½ to 51 cents; machine made barrels, 51 to 51½ cents per gallon.

PRICE-LISTS, CIRCULARS, &c.

Manufacturers in Hardware and related lines are requested to send us duplicate copies of catalogues, price-lists, &c., one copy for our Catalogue Department in New York and another for our London office; and at the same time to call our attention to any new goods or additions to their lines, of which appropriate mention will be made besides the brief reference to the catalogue or price-list in this column.

I. E. PALMER, Middletown, Conn.: Illustrated catalogue devoted to a large variety of Hammocks, Hammock Supports, Awnings, Trapezes, Mosquito Bars, Hooks, Ropes and other accessories.

THE WHITE MOP WRINGER COMPANY, Fultonville, N. Y.: Catalogue illustrating and describing the White Mop Wringer.

THE FORQUIGNON MFG. COMPANY, 13 East Sixteenth street, New York: Illustrated catalogue of Manicure and Pedicure Instruments and Supplies, with directions how to manicure.

THE BARNES MFG. COMPANY, Mansfield, Ohio: Spray Pump catalogue. In addition to a variety of portable, barrel and knapsack spraying devices and accessories illustrated and described information is given in regard to spraying, in connection with which diseases of plants are described, with formulas for spraying mixtures for their cure. On a separate folder is the company's spraying calendar, giving a list of plant diseases, the kind of spraying mixture to use for each and when they should be used.

PARRY MFG. COMPANY, Indianapolis, Ind.: Catalogue for 1905 relating to Surreys, Phaetons, Buggies, Stanhopes, Driving, Road, Spring and Delivery Wagons, Carts, &c.

EAGLE LOCK COMPANY, Terryville, Conn.: Extra leaves for insertion in catalogue devoted to Cabinet, Piano, Pad, Trunk and Suit Case Locks, Sample and Suit Case Corners and Hardware.

THE AVERY STAMPING COMPANY, Cleveland, Ohio: New price-list December 1, superseding all previous issues, on Hollow Back and Patented Smooth Back Shovels, Spades and Scoops, Alaska Steel Snow Shovels, Tropic Ash Shovels, Klondike Sidewalk Scrapers, Never Break Ore Shovels, &c.

THE NEW DEPARTURE MFG. COMPANY, Bristol, Conn., for whom John H. Graham & Co., 113 Chambers street, New York, are selling agents: New 30-page illustrated descriptive catalogue showing lines of Bicycle Bells, Coaster Brakes and Cyclometers, together with a new line of plain front and rear wheel Hubs for bicycles on the lines of its Coaster Brake Hubs as made for two or three years past. The line of Coaster Brakes is suitable for bicycles, tandems and motor cycles.

THE BERGER MFG. COMPANY, Canton, Ohio: A new edition of its Metal Furniture catalogue, entitled "Steel, Style and Safety," which contains a number of new goods in the line of sheet metal furniture and office equipment. A full description of the constructive features and advantages of sheet metal furniture is given, together with illustrations of some of the company's products, including document cases, book shelves, combination cases, roll-top and flat-top desks, counters, bank furniture, adjustable shelving, card index and filing cabinets, wardrobes and shop lockers, library tables, safe deposit boxes, &c. Special attention is called to the sectional cabinet which is now being put on the market, containing devices which can be adapted to every office, large or small.

THE ATLAS BOLT & SCREW COMPANY, Cleveland, Ohio: Catalogue and price-list relating to Stove, Tire, Carriage, Machine and Sink Bolts; Nuts, Iron and Brass Machine Screws; Tinners', Coopers' and Bulk Rivets; Stove Rods, &c.

STOUGHTON WAGON COMPANY, Stoughton, Wis.: Illustrated and descriptive catalogue of the New Stoughton Farm and Mountain Wagons, Trucks, Teaming Gears, One-Horse Wagons, Sleighs, Bolster Springs and Spring Wagons. The company has recently erected a new storage warehouse with more than 100,000 feet floor space.

BETTER PRICE-LISTS.

BY OBSERVER.

IT has been said that the price-list is a much neglected article in the average Hardware store, and to a great extent the saying is true. The usual piece of cardboard with soiled surface, battered edges and worn corners is found in many a store which is exceedingly modern in other respects. Experienced clerks refer to the list more from force of habit than because of any information to be deciphered therefrom, and the new employee is often more confused after reference to the card than he would be were he to trust to memory alone.

Marking directly upon merchandise and upon shelf boxes and original packages is to a large extent replacing the list system of our predecessors, yet there are many lines which even now can best be priced by using lists. Such lists always should be clean and legible. A little attention and the application of system will insure these things.

The old cardboard list is gradually being replaced by neatly framed and glass covered paper lists. Good, durable holders of various sizes can be made by bending the side and bottom edges of a strip of tin to form grooves which will hold the glass and list in place. These can be slid out from the top whenever an alteration or a new list is necessary. A hole punched through the upper end makes it possible to hang the list in a convenient place for reference.

A variation of this plan is to have made a number of frames of the proper size to hold a legal sheet of paper. These frames can be made of plain molding, and are inexpensive. The list and glass are placed in position by removing the back. Then the lists, whether short or long, are written or typewritten upon paper of this uniform size. These frames are hung in place by means of small screw eyes placed in the tops.

Either of these plans is a vast improvement over the cardboard idea, and while the first cost is somewhat more the ultimate value is much greater.

THE LISK MFG. COMPANY, Canandaigua, N. Y., is giving a novel souvenir in the shape of a miniature Dinner Pail, complete with two metal trays and a drinking cup. Miniature Basins in block tin and Mottled Enameled Ware are also among its souvenirs, all of which are illustrative of the goods manufactured by the firm. The Maltese Cross given at the World's Fair was one of the most popular souvenirs of the Fair and had a very wide distribution.

A PATENT on improvements in Door Hangers was granted to John H. Burkholder of the Safety Door Hanger Company, Ashland, Ohio, on October 13, 1903. This patent was contested by a rival inventor, who claimed priority. The matter has recently been decided by the United States Patent Office in favor of Mr. Burkholder, who is given the credit of the invention and a patent granted.

CATALOGUE HOUSE COMPETITION IN NEBRASKA.

THE LEADER HARDWARE & FURNITURE COMPANY, Exeter, Neb., is taking hold of the catalogue house question in an enterprising and aggressive manner. In a large illustrated poster recently issued, entitled "Our Second Special Price Maker," the firm addresses the public in the territory cultivated by it in part as follows:

> As we stated in our first announcement last spring, we see much sending away for goods to catalogue houses. After a thorough study of ———'s latest catalogue and seeing some of the ridiculous statements and comparisons they make between the retailer's prices and their own (what do they know about the average retailer's price except in Chicago or Kansas City, which is no just comparison with country towns?), we are prompted by justice to ourselves and our patrons to take up more fully a line of advertising that will post our people on our prices, that they themselves may compare and see if these people's statements will hold good or if we are false to our customers.
>
> As we have stated before, they sell some small articles and staple goods below cost, as leaders. But, on the other hand, we can show numberless articles we sell cheaper than they do in Chicago. This is where so many people make a mistake. They pick out a lot of small articles, and then to make weight they put in some other articles they are not posted on, and when they pay their freight, draft, stamps, &c., we would be glad to furnish the goods to you at what they cost you laid down at Exeter. Besides, you see and know just what you are getting when you buy from us.
>
> Why can they sell cheaper than we do? It does not cost us as much to handle goods as them. Besides, home competition would not allow such profits as they make on articles which the people are not posted on.
>
> We ask you to consider these statements, and from a common sense standpoint. Below we give you a few statements in each line of goods, as we have not room for many in each line. But if you will call and go through our stock with the catalogue and compare items, prices and freight figures, we can show you many other items.

The firm then makes a comparison between catalogue house prices and its own on a few lines in the following manner:

	Catalogue house.	W'ght. Lbs.	Freight.	At Exeter.	Our price.
25-lb. Spring Balances	$.05	½	$.00½	$.05½	$.05
48-lb. Spring Balances	.12	¾	½	.12½	.10
Full Brass Lined Boxwood Rules	.45	¼	½	.45½	.45
2-quart Pudding Pans	.08	⅛	¼	.08¼	.05
Japan Dust Pans, I.C. tin	.06	½	⅛	.06⅛	.05
Octagon Cake Tins, 10-inch	.06	½	⅛	.06⅛	.05
Mrs. Potts' Sad Iron Handles, common	.06	¾	½	.06½	.05
Retinned Soup Ladles, wood handles	.05	¼	¼	.05¼	.05
Dover Egg Beaters, large, improved	.12	½	½	.12½	.10
Maple Butter Molds, fancy	.14	1	.01	.15	.15
Wood and Wire Potato Masher	.05	1½	½	.05½	.05
2 5-inch Hooks and Staples	.04	1½	.01	.05	.05
6 and 8 inch Hasps	.05	1½	.01	.06	.05
Scalloped Tube Cake Tins	.06	½	½	.06½	.05
Wire Soap Dishes	.10	½	⅛	.10⅛	.10
Large Wire Toasters	.10	⅛	⅛	.10⅛	.10
Wood Spoons for kitchen	.04	½	½	.04½	.04
Wire Egg Beaters	.02	½	⅛	.02⅛	.02
Wire Card Racks	.13	¾	½	.13½	.13
1-gallon Galvanized Oil Cans	.16	1	⅛	.16⅛	.13
Dietz Glass Fount Lanterns	.62	2½	.02½	.64½	.65
100-foot Galvanized Clothes Line	.23	4	.02	.25	.25
Acme Roasters	.55	..	.02½	.57½	.50
12-quart Flaring Milk Pails	.13	..	.01½	.14½	.15
12-quart Galvanized Pails	.18	3½	.02	.20	.20
Nickel Plated Crumb Tray and Scraper	.25	1	½	.25½	.25
4-quart Shepard Ice Cream Freezer	2.30	..	.21	2.51	2.30
Rotary Apple Parer	.77	3	.03	.80	.80
No. 9 Galvanized Wash Boilers	.77	..	.11	.88	.85
Best X Copper Bottomed Wash Boilers, with set cover	.74	6½	.04	.78	.75
The best Clothes Wringer made	3.75	37	.27	4.02	4.00
Fire Shovels	.07	..	..	..	.05
10-gallon Barrel Churn	2.58	46	.52	3.10	3.00
Kraut Cutter, 9 x 30 inch, 3 knives	1.49	10½	.06	1.55	1.50
Best Silver Steel Hand Saw	1.90	4	.03	1.93	1.75
Mrs. Potts' Sad Irons	.77	10	.10	.87	.85

A similar comparison of prices is then made on an assortment of furniture, after which Stoves, Enameled Ware, Carpets, Floor Mattings, Linoleum and Oil Cloth are taken up.

The above matter concerning prices occupies the body of the poster. At the bottom a few more remarks are addressed to the public, from which we make the following extracts:

> We pay tax in Exeter, in Fillmore County and in Nebraska. Do mail order houses do this?
>
> We extend you credit when you need it. Do the catalogue houses trust you for a cent?
>
> Investing our money here increases the value of your property. Do they do this?
>
> If the catalogue houses succeed in driving one-half of the retailers out of business in this country, what would happen to the value of property in town and country? What would your taxes be?
>
> These are questions of grave importance. If you could save money as they say it would be different, but you cannot, as you will be convinced if you will treat us with the same respect you do them, and compare our prices with theirs, and give us as much confidence as you do them.

UNDERMINING THE CATALOGUE HOUSES.

A WESTERN merchant with a view to demonstrating that goods can be bought as cheaply or cheaper at home than from the catalogue houses selects each week a few articles from his stock and advertises them in his local papers with prices. In the same announcement mention is made of the prices which are quoted on the same goods by certain catalogue houses whose names are given. The prices which the merchant puts on the goods are always as low as if not lower than those named by the catalogue houses, when freight or express charges are taken into account, giving the merchant the advantage of being on the ground and able to show the goods to the customer. In this way patrons of the catalogue houses are constantly being won over by the aggressive merchant.

TRADE ITEMS.

GEO. H. ISMON, who is well and favorably known to the Pacific Coast trade, especially in connection with the sale of Wire and Wire Nails, with which he was identified for many years, is now managing the business of the Pierce Hardware Company, Oakland, Cal. This establishment makes a specialty of fine Builders' Hardware, and also handles Sporting Goods, Stoves and Ranges, Gas and Electric Fixtures, &c.

HENRY DISSTON & SONS, Philadelphia, are about to start a Saw factory in Canada. They have purchased property in Toronto, Ontario, and are now clearing out a building on the site with the idea of putting it into shape for use until the weather permits of the erection of a new and larger plant. The purpose of this Canadian factory is to put the corporation in a position to take better care of its interests in that part of the world than has heretofore been possible. The new plant, which it is purposed to erect as soon as feasible, will be 52 x 190 feet, and the company expects to have a working force of 50 men by July 1 next.

THE VICTOR STAMPING COMPANY, Loveland, Ohio, in addition to the manufacture of the Victor Oval Bottom Coal Hod, is making the Victor Tub and Water Pail, as well as other kindred articles and all kinds of special work to order.

J. STEVENS ARMS & TOOL COMPANY, Chicopee Falls, Mass., has prepared for gratuitous distribution among its friends and the trade generally a very attractive aluminum sign. The hanger is in three colors and includes an artistic frame. Some of the hangers illustrate the company's Favorite No. 17 Rifle and others the No. 370 Shotgun.

THE SCHATZ HARDWARE MFG. COMPANY, manufacturer of Hardware specialties and Sheet Metal Stampings, which removed its factory from Mt. Carmel, Conn., to Chappaqua, N. Y., in February last, has installed a new steam plant of greatly increased capacity, owing to the marked growth of its business. The plant is now in full and successful operation. This company manufactures Hardware articles in sheet metal, forgings or castings, and makes a specialty of drawing and stamping

difficult pieces in sheet metal. Its plant is one of those connected with the Smith & Hemenway Company, 296 Broadway, New York, this office being New York headquarters.

LOCKS AND BUILDERS' HARDWARE.

"LOCKS AND BUILDERS' HARDWARE" is the title of a handbook for architects from the pen of Henry R. Towne, president of the Yale & Towne Mfg. Company, New York. It will doubtless take its place as a classic in its field, and apart from the interest of the matter and its attractiveness typographically will be found a valuable work for reference, reflecting credit on the author and his collaborators in its compilation and production. The mechanical features of the volume include profuse illustrations on fine paper, flexible leather binding, gilt edges and nearly 1200 pages, each 6½ x 4, with rounded corners. Little is left to imagination where an illustration is possible, there being reproductions not only of prosaic Locks and staple forms of Builders' Hardware, but exhaustive illustrations, large and small, of unique and famous historical structures and articles, often full page in the case of castles, palaces, cathedrals, galleries, mosques and other buildings and examples of architectural styles with which the book has to do. The various details of columns, capitals, pediments, panels, cabinets, chests, fire places, &c., are supplemented by illustrations of furniture, such as chairs, chests, hanging clocks, coffers, mirrors, candlesticks, ceramic bottles, screens, and so on, almost without end.

A modern Yale Lock in section, with every part numbered, is first shown, followed by a glossary of technical terms relating to Locks and Hardware. Then come ten parts, or subdivisions, as follows: Narrative and Historical, Mechanics of Hardware, Art Metal Work and Ornament, Locks and Latches, Locks in Sets, Plain Hardware, Hardware Groups, Ornamental Hardware for Cabinet Work, Specifications, Miscellaneous Information. These are followed by detailed general and numerical indexes. The scope of these various parts is briefly explained in an introduction. It is thus, for example, explained that Part IX (page 994) contains specifications and instructions for the ordering of Hardware and gives explanations on this subject of practical use to the architect and builder, the observance of which should be conducive to the avoidance of misunderstandings and delays in the execution of orders. Those conversant with the minutiæ of Hardware trim to-day, especially for large public buildings and fine residences, will appreciate the helpfulness of this portion.

Facts and illustrations from a great variety of sources have been drawn upon to enrich the work, including references to the art of the Cave Dwellers and of the Mound Builders and Aztecs, the crude beginnings of an evolution which has resulted in the development with which the modern world is familiar. There are illustrated examples of articles and workmanship produced by savage tribes in various countries, along with the art of the Egyptians, Chinese, Japanese, Persians, East Indians, Greeks, Romans and Pompeiians, with chapters devoted to the Byzantine, early Christian, Saracenic, Celtic, Moorish, Turkish, Romanesque and Gothic schools. Then follows an interesting series of articles on schools of ornament from Francis I to those of to-day, under the following divisions: Francis I, Henry II to IV, the German, Spanish, Flemish, English and French Renaissance; Elizabethan, the Louis's (XIII to XVI), Colonial, Empire, L'Art Noveau and modern schools. There are also many examples of emblematic, proprietary and French Hardware of the present. An explanatory section on metals and finishes is especially pertinent.

Interwoven with the illustrated historical matter, which is clearly and attractively presented, pertaining to the various schools of design, are, each in its proper place, the available Yale & Towne designs, with page references to other parts of the book. This work, which is published by John Wiley & Sons, New York (price, $3),* is a notable contribution to trade literature and should be of great assistance to architects and all who desire the full and detailed information it contains, so much of which is inaccessible except to specialists. It reflects great credit upon its scholarly author and the house of which he is the head, who have been pioneers in the production of artistic Hardware. It should be influential wherever it is used and studied in elevating and dignifying the handling of the important and complicated line to which it relates.

* For sale by David Williams Company, 232-238 William street, New York: price $3.00, postpaid.

BAKER HARDWARE COMPANY'S INVENTORY METHODS.

WE are indebted to the Baker Hardware Company, Sioux City, Iowa, for the following matter relating to its method of taking inventory. The system, which is described in the instructions to its employees given below, is the result of study of several years, and the plan thus elaborated, improved as it has been from time to time, is regarded as now admirably adapted to its requirements and for its purposes practically perfect. Our readers will be interested in the method employed. The use of the diagram as a guide to the order in which stock is to be taken is referred to by the company as the simplest way of indexing and as serving the purpose efficiently and satisfactorily.

INVENTORY INSTRUCTIONS.

We give below a few suggestions with reference to the taking of inventory by means of which to simplify and facilitate the work. Kindly study and work out any improvement which, after giving the matter thought, will occur to you so as to make the taking of invoice easier and quicker:

Preparation.

The first thing is to get ready, and you should begin at this early in November. The stock should be carefully arranged so as to have all goods of a kind put together. All goods should be nicely piled and systematically arranged so that the different sizes will come in perfect order. In those goods that go by numbers, such as Curry Combs, have the numbers come in rotation. Go through the shelving from end to end, arranging the goods in orderly shape so as to facilitate counting and taking stock.

"Order and system save a great amount of time."

If you will have all goods piled in a neat, compact and orderly shape, this will reduce the work of taking inventory at least one-half and it will not be nearly so irksome and tedious. Carefully clean and brush stock as you go along.

Taking Inventory.

On December 10 begin to count slow goods, out of season stuff, &c., using a 4 x 6 manila card furnished for that purpose, headed "taken" on one side and "withdrawal" on reverse side, which attach in front of the bins taken, having "withdrawal" side facing out. Note withdrawals on same as goods are taken out after they have been invoiced.

Goods to take beginning December 10 or before are:

First Floor and Warehouse: Wire Cloth, Screen Doors, Gasoline Stoves and Ovens, Snaths, Freezers, Poultry Netting, Lawn Mowers, Paints, Sash Weights, Galvanized Sheet Steel, surplus stock, &c. Sheet Steel and Galvanized Iron can be taken beforehand. The weights should begin with the bottom pack so that the top pack is taken last. In this way when you count the number of bundles, the weights you have will be for same and what has been sold will be the weights you have left over.

Second Floor: Spring Hinges, Bicycle Tires and sundries, slow selling Builders' Hardware, Malleables, Clevises, Hay Carrier sundries, Hinges, Fishing Tackle, surplus stock, &c.

Third and Fourth Floors: Hoes and Rakes, Hose, Hardware Cloth, Freezers, Plow Handles, Grass Hooks,

Tinners' Trimmings, Twines, Scythes, Faucets, Drip Pans, Bird Cages, surplus stock, &c.

All of you should be on the lookout for slow goods and anything that is troublesome to get in order, and stock should be taken before beginning the regular taking of inventory. Do not stop with just taking the goods listed, they are only mentioned as a suggestion, but take all slow goods as your judgment will indicate.

Surplus goods add in with regular inventory and this should be taken first. Tack card on same "Taken," and then a card is to be tacked on the bin where stock is kept showing the amount of surplus. The total stock of any item must be given complete in one item and not in several items scattered through.

On December 26 regular taking of inventory is to begin and not a moment lost in hurrying the work to completion. A catalogue should be carried along with each gang so as to get the right numbers for the goods where there is any uncertainty as to same. The sheets must be carefully written up, as the first copy is what is used, so it should be plainly and nicely written. Be careful to leave lines for discount, always leaving a line between the different kinds of goods. Enter the quantities according to the way the goods are priced in catalogue, whether each, dozen or gross. Those who do the writing must be familiar with this branch of the work. Do not pass any goods, but if to be attended to later or by some one else, make a note on the sheet reserved for special notations for this, goods received, &c.

Goods Received.

In the case of shipments of goods received during the taking of the inventory and which are to be added from the factory bill to the inventory, make a note of same immediately as you come to these shipments, keeping a separate sheet for this purpose. It is only necessary to mention the class of goods and the name of the factory, stating number of boxes or packages. Mark them with a reference number or letter, which note on the sheet.

Odd Goods.

As you come to odd goods, odds and ends, or anything in bad order, &c., while invoicing, be careful to put a check on heavy line after same with red pencil to call special attention to it.

Withdrawal.

Withdrawal on the slow goods invoiced in advance is to be kept on the sheets fastened to bins, as mentioned in the fore part of this outline, until these goods are reached in regular taking of stock. When regular taking of inventory begins, carry a red lead pencil and *in filling orders* as you take goods out of stock that have been inventoried put a heavy red check on the heavy line after the goods. *Do this at once when you take the goods.* This is to save the burden of writing off and figuring it all over again. Extreme care must be exercised in keeping track of withdrawal in this way and no goods are to be sent down upon any one's calling for them, but the sheet must be presented. In the office an abstract of the figures only in cash column is to be taken off each evening under supervision of party directing the taking of inventory, who will know progress being made and be in position intelligently to attend to this.

Rules to Follow.

Hand in sheets every night to party in office who has charge of inventory taking. Do not confine yourselves to suggestions that are merely made here, but from your working steadily in the stock you should be better able to originate methods to simplify the work and how to arrange the goods, &c., than any one else.

Inventory Plan.

The diagram below is intended to represent the plan of the floor and shows the order to follow in taking inventory, as indicated by the figures 1, 2 and 3, &c., and there must be no irregularity in following same. Sheets will be furnished from the office, the regular order sheets being used. These sheets should be numbered in pencil in left hand corner as page 1, division 1, &c. The figures on diagram represent the divisions. Each division must be taken complete before starting on anything else.

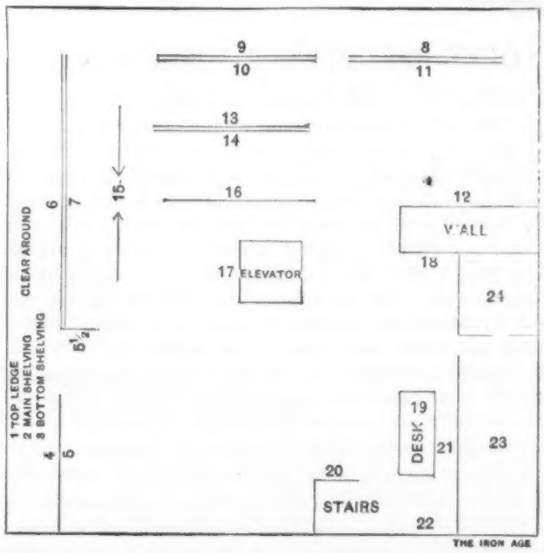


Diagram Second Floor (Shelf Goods), Double Lines Indicating Double Shelving, Which Faces Both Ways.

Method of Indexing.

The indexing is done by stating the pages for each division embraced, as indicated by the figures, giving the order to be followed, a separate diagram being used for the purpose. This plan will usually answer, and especially where parties are familiar with the general arrangement of stock throughout the building. Another method is to use the department division as presented in the front of Hardware catalogues, which can be subdivided to any extent desired, and inventory pages stated thereafter.

AMONG THE HARDWARE TRADE.

G. R. Dill has bought the Hardware, Stove and furniture business of F. C. Upton, Belvidere, Neb., and will continue at the old stand, which will be thoroughly renovated.

Stevenson & McCullough, College Springs, Iowa, have disposed of their Hardware and Implement stock to Jos. Maltby & Co.

M. L. Pase has bought the interest of S. B. Stoner in Stoner & Gillam, Hardware dealers at Ashland, Oregon.

A. E. & G. P. Hull have opened with a stock of Hardware in the Wahl Building, Redwood City, Cal.

Wachter, Arnholt & Co., Pender, Neb., have succeeded Wachter, Wenke & Co., in the general Hardware and furniture business.

C. F. Harris has opened a new Hardware store at Forest Grove, Oregon.

W. O. Dodds has disposed of his Hardware, Implement, Buggy and Wagon business at Belle Center, Ohio, to Stephenson, Porter & Corwin, who will continue at the old stand.

Wine & Banhard will succeed W. W. Wine in the Hardware business at North English, Iowa, January 1.

Frank J. Roeh has bought Jones & Winne's Hardware business at De Witt, Iowa.

Frank M. West, Bridgeport, Conn., has added a five and ten cent store to his Hardware, Paint and Sporting Goods business.

FACTORY COST AND BUSINESS METHODS.

SUGGESTIONS FROM EMPLOYEES.

THE National Cash Register Company, Dayton, Ohio, in a book of 125 pages, entitled "Suggestions from Employees," presents information in regard to its methods which should be of value to managers and students of modern business methods. The aim of the system is to secure and develop the intelligent and hearty co-operation of the entire working organization in the adoption and perfecting of better ways of manufacturing and selling the company's product. With a view to this end, the suggestion of good ideas by any employee obtains reward in one form or another for those who originate them, no matter how humble their position. This may be in cash prizes or promotion or other recognition.

Suggestions Go to Factory Committee.

Suggestions go directly to a Factory Committee, for which a receipt is given to the originator, using a form as here reproduced, thus reaching headquarters without running a gauntlet of foremen, superintendents and others by whom they might be appropriated, as sometimes occurs in factories and elsewhere.

Receipt for suggestion.

Date _____

M _____

We hereby acknowledge receipt of your suggestion of _____ relative to _____

_____

The suggestion will be considered by the proper committee, and you will be advised as soon as possible of the decision.

We thank you for this suggestion and assure you of our appreciation of your effort to assist us. We would be pleased to receive other suggestions from you.

FACTORY COMMITTEE,

Per _____

Provision is thus made as to how and where to send either suggestions or complaints, the merit or demerit of a suggestion being determined by a competent, impartial body properly qualified for the duty.

Cash Prize Distribution and "Other Valuable Considerations."

During the period 1899-1903, inclusive, the company has paid out in prizes for suggestions the sum of $10,152.68. While the average employee receives the cash prize as a tangible and acceptable negotiable recognition of the intrinsic value of his "think," it is likewise true that the compilation in attractive form of the book matter under review for free and wide distribution, is a valued asset—a Roll of Honor—to the energetic, aspiring individual not content with what is, but convinced that there is always "room at the top." These cash prizes are given in the presence of thousands of work people and their families. A handsomely engraved certificate or diploma is also awarded, which in itself is a valued recommendation. One of these certificates reads as follows:

This Certifies that

.....

has been awarded ..... Prize for Valuable Suggestions submitted between July 1 and December 31, 1901.

In token of our appreciation we hereunto subscribe our names and have caused the Company's Seal to be affixed this ..... day of ....., Anno Domini ..... at Dayton, Ohio, U. S. A.

Semiannual Prize Distributions.

The prizes are distributed semiannually in some suitable place according to the time of year. One of these functions was held in the homestead grounds of the president of the company with *fête* accompaniments—decorations, illuminations, fireworks, dancing, &c.—about 4000 being present, including employees and families, with some special guests. On another occasion a good sized theater was filled from pit to dome. A notable gathering of this character was the international convention of July, 1900, when officers and salesmen were present from Great Britain, France, Germany, Sweden, Holland, South Africa and other distant points.

Getting Together; Exchanging Experiences.

The men of the selling force are assembled in small groups each week, and at longer, though frequent intervals, district and general conventions are held, the purpose of which is to seek and obtain suggestions and criticisms about the sales work. The suggestions elicited are approved or rejected by the vote of all present. Blackboards, cash registers and other paraphernalia used indicate the businesslike and practical manner in which these assemblies are conducted.

Descriptive Record of Prize Winning Suggestions.

Beginning with 1898 the booklet presents many crisp detailed records of suggestions adopted at intervals of, say, two weeks, with name of person, number of department and reference to accepted suggestions, sometimes accompanied with illustrations of detail parts of the Register as improved. The entire book is copiously illustrated, there being portraits of salesmen, mechanics and others with brief sketches of their business history with the company, given in their own language, telling how they started, what they have accomplished; describing in terse, matter of fact phrases their mental contributions and reasons therefor.

REQUESTS FOR CATALOGUES, &c.

The trade are given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS *for catalogues, price-lists, quotations, &c., have been received from the following houses and are referred to the manufacturers:*

FROM HUSTON & SIMON, Independence, Ore., who are successors to Frazer & Rice, in Hardware, Stoves, Implements, Paints and Sporting Goods.

FROM THE ALLEGAN HARDWARE SUPPLY COMPANY, Allegan, Mich., a corporation recently formed to carry on the Hardware, Stove, Paint, Plumbing, Roofing and Sheet Metal business.

FROM CENTRAL MERCANTILE COMPANY, Enid, O. T., wholesale dealers in Shelf and Heavy Hardware, Paints and Oils, &c.

FROM WM. SCOTT, Westmoreland, Kan., who lately purchased the Hardware business formerly conducted by A. H. Reed.

FROM SEIDL & EBBE, Joseph Seidl and J. J. Ebbe, formerly of Marshfield, Wis., who have succeeded the Jensen-Lowell Hardware Company, Pittsville, Wis., and will continue at the old stand, making a number of improvements and materially increasing the stock.

FROM SMYTH-DESPARD COMPANY, Utica, N. Y., which on January 1 will open up for business with a full line of Mill Supplies, Machinery, Tools, &c. The temporary office of the company is 68 City National Bank Building.

FROM LAKE CITY HARDWARE COMPANY, Coeur D'Alene, Idaho, which has succeeded Steinke-Taylor Hardware Company, and will continue the retail business in Shelf and Heavy Hardware, Stoves, Implements, Paints, Sporting Goods, Plumbing, &c.

FROM CRABTREE & MELTON, Atwater, Ill., who are successors to C. R. Hamilton & Co., in the Hardware, Stove, Implement, Sporting Goods, Buggy, Wagon and Harness business.

FROM J. B. CHAMBERS & SON, Danville, Ill., wholesale and retail Hardware, Implements, Paints, Sporting Goods, &c.

TRADE WINNING METHODS.

This department is for the description of approved methods of carrying on and extending business, and a cordial invitation is given to merchants to co-operate in the effort to make it suggestive and of practical use to the trade.

ADVERTISING HINTS FOR HARDWARE MERCHANTS.

Second Article.

BY SPECIALIST.

CLERK CO-OPERATION.

Treat your clerks as friends. If you don't, they won't be.

Show human interest in them.

Raise a good one without his asking for it. Yours is the profit, after all.

Encourage clerks in coming to YOU. Candor begets loyalty.

Make clerks realize their need of your counsel in a crisis.

When a clerk realizes fully that his employer's interests are His interests, it takes an axe to keep him out of the firm.

FOR WOMEN-FOLKS ONLY.

Let's have a quiet consultation, for if you are racking your brains to know what to get HIM for his Christmas, we can aid you. If you want a man to praise your sound sense, give him no finery, but hand him something useful. Now, there's one thing every man uses (some ought to use them oftener) and that is Shaving Materials. And you can't buy good Razors in a dry goods or drug store. Those things are side issues with them, but they are staples with us. Some Razors are made only to sell. Ours are made to shave. We know a good Razor when we see it, so you may rest secure in our goods. Now, we have everything in Shaving Outfits, and we can fit any purse. Tell you what you do. Just come in and look at our line. We'll help you to get the right thing, and we'll try to help you keep your secret. That will be hard work, for our Razor stock is so good that we like to tell all about it. Our "office hours" are those of daylight, so come any time. Oh, yes, we will answer questions by mail. Send any amount you can afford to us, and we will send you a Shaving Set complete. That's the twentieth century way.

Without any intention whatever of giving the above a patent medicine appearance there is used a head-line which appeals very very strongly to human nature. The trade of women is solicited and Christmas suggestions for men are made, so it makes legitimate reading. Now it also makes a peculiarly strong appeal to men, as you who have been attracted to it can vouch for; so the advertisement works both ways. The above ad. is selling Razors and Shavings Sets right now.

(THE ADVERTISEMENTS THAT *The Iron Age* WILL USE EVERY WEEK IN THIS DEPARTMENT ARE THOSE WHICH HAVE BEEN USED DURING THE PREVIOUS WEEK BY RETAIL HARDWARE FIRMS. THEREFORE, IT MAY HONESTLY BE TOLD JUST WHAT THE ADVERTISEMENT DID IN THE WAY OF RESULTS. AND YOU MAY REST ASSURED THAT NONE BUT SUCCESSFUL "COPY" WILL BE REPRINTED.)

Much has been said relative to a very essential detail of store management, and mighty little has been done along that same line, by which I refer to clerk co-operation. The liveliest "business getter" that lives is of no avail whatever if the business is to be carelessly handled by employees. That which the "getter" has worked months and months to get goes glimmering. No man can breed salesmanship, or loyalty, or conscientiousness in an employee any more than he can breed four air cells in an egg, but every man who employs assistants can teach and guide and lead them on to a reasonable degree of perfection. The more knowledge a man absorbs from an employer the more he's worth. A trifling increase of salary, unasked for, works wonders. I know of one employer who makes his boast that never yet has an employee had to ask for a "raise." Such loyalty as his people feel! Many a generous bribe to leave him has been turned down. In the hands of that kind of clerk any man's business is safe.

Absorbing Knowledge

In another case, a Hardwareman I know who felt his clerks needed a bit of ginger got in touch with a school of scientific salesmanship. (I don't propose to enter into a discussion over it; so far as I know this school is all right, but it wasn't in this case.) The school folks sent out a lot of printed matter, truisms, facts, &c., and these papers were turned over to the clerks. The errand boy, an Anglicized Italian, took hold with avidity, and his work soon had a keener edge. A man who had been there over 30 years and hadn't gotten above the $14 a week stage, only smiled when reference was made to the salesmanship papers. Another chap of thirty years of age, who outranked all others and was known as the "head clerk," paid no attention whatever to them, yet he was the very one they would have benefited. *There* was a waste of good American dollars if ever there was one! The fault there was with the men themselves. None but the boy was worth having around the place.

Costly Indifference

Once a Hardware retailer needed repairs to his Nail bins. Upon sending to a boss carpenter the latter said he would attend to it. But he didn't, and the retailer sent for a local tinkerer, who did the work. Of course, the tinkerer was a nonunion man. While he worked in came a union man. Seeing the "scab" the union man went away. Trouble resulted and it took a whole lot of manipulation to stave off an actual boycott. For months the union trade went elsewhere, but by degrees it came back until, finally, in came the very labor leader himself. He wanted a set of Chisels. When they were shown him and the price quoted, he sullenly refused to buy, saying he could do better elsewhere, or from a catalogue house, I've forgotten which. And out he went. There that retailer had spent months of cajolery, and done all he could to make peace, and a clerk let the whole bottom right out of everything. Of course, the clerk didn't know the details, but was it not part of the retailer's business to post his people and have them primed for such an emergency? Wouldn't it have been money well spent to have met any price, so long as the malcontent was kept pacified? Wouldn't tactful handling have pulled the sting from that "bee" without the danger of being stung in return?

Shortsighted Merchant

Illustrating the potentiality of co-operation, let me cite a splendid example. A Western newspaper had prepared a set of books. The fact that they were good books was not relied upon to sell them. No, indeed. As good a corps of men as could be gotten together were assembled. Were they given a "stretcher" (showing the book backs) and a few sample pages, the price, contract blanks, and sent out? Not by a long shot! They were schooled and drilled for days and days. Before a man was allowed to go out and sell them he had to go through an ordeal worse than a prospective customer could possibly furnish, for he had to make a solicitation, the manager of the sales department acting as the "prospec-

ive customer." Such objections as had to be overcome and arguments to be met! When a man got through that he was thoroughly primed, yet I knew more than one man who studied his books by night, and after repeated efforts, finally "sold" a set. Then, and only then, could he gain access to real customers. Every Saturday, for book agents don't work on that day, a meeting would be held, at which every man had to tell his experiences of the week. Peculiar, indeed, were the stories and reasons why the sales had not been effected in unusual instances. But of what immeasurable benefit it all was! And the result of those experience meetings showed right in the reports of the sales manager. There was systematic co-operation that made the printers hump themselves to keep the supply equal to the demand.

Thoroughly Primed

There's another variety of co-operation that comes to my mind. That brand of human discomfort known as traveling men, drummers and the like are the greatest kind of aid, if properly manipulated. On the go all the time, in and out of scores of stores, they necessarily absorb much valuable information. I know a Hardwareman who has the happy faculty of having so trained the traveling men that come his way that they make mental notes of all the business building ideas and store plans, display ideas, &c., and when they reach the store of their friend they divulge these things. The result is easily imaginable. The more clever people there are to tell a clever man of clever things the more clever things some one man is able to do, and the brighter his store and the better his business. Cleverness is seldom original. Oftener than otherwise it is plagiarized, dyed and transformed till it passes current as one's own property and thought. Legitimately borrowed and used, it is a power. And the only harm done is the final result on the "other fellow's"—the sleeper's—business.

Utilizing the Traveler

CHRISTMAS IN THE BERKSHIRES.

WITH a view to bringing before the purchasing public in an effective way the line of goods which it handles during the Christmas season, Peirson Hardware Company, Pittsfield, Mass., issues a neatly printed booklet, one of the pages of which, reduced, is shown herewith, to give an idea of the style and spirit of the publication. In connection with the "Say, Father," cut the company advises us that it set out deliberately to obtain such a picture, the photograph being taken by one of the Peirson family. The booklet is printed in two colors, the text being in red and the illustrations in green. On every page the slogan of the company, "Right in the center of the city," is brought emphatically to the reader's attention. The booklet covers a wide variety of goods appropriate for Christmas gifts and is doubtless doing good work in bringing customers to the store responsible for it.

CONTENTS.

NEW ORLEANS NOTES.

FROM A SPECIAL CORRESPONDENT

NEW ORLEANS and the Hardware world of the immediately surrounding country have suffered somewhat of a shock since the Government cotton estimate was sent out, and the merchants and dealers are now wondering just what is going to be the effect of the reduced purchasing power of the cotton country on the winter and spring Hardware trade from New Orleans into Mississippi, Louisiana, Arkansas and Texas. Yesterday a number of the Hardware dealers of the city declared that they did not anticipate any appreciable diminution in the business of their lines during the winter or spring, claiming that the decrease in values of the cotton crop that would come from the planter's profits would in no wise affect his purchase of the necessities of either his home or his business activities.

Generally, the lines have run well for the last 30 days, and considerably ahead of last season. Hardware for builders and for household supplies has gone well into the cotton section; better into the cane country, very well into the lumber regions, and least well into the rice lands along the Gulf coast. Staple goods have been favorites with the lowland country of Mississippi and Louisiana, whether in the cane or the cotton belt, while the rice country has bought little. The pine belt has been a good purchaser.

Mill Supplies in Large Demand.

Mill Supplies have distanced, relatively speaking, all other lines; for the cotton gins, the cane mills and the saw mills have been running overtime from the Gulf to the northern bounds of the cotton, cane or timber belts as the case might be in the several lines. There has never before been such a demand for Mill Supplies, and the jobbers and wholesalers have had to increase their standing stocks time after time. The demands from the cotton country have been 25 per cent. greater than they were last year; from the cane country 30 per cent. greater, and from the timber lands fully 10 per cent. greater.

Ship Chandlery Booming.

Another line, much less important, but strikingly significant of future developments, has been Ship Chandlery. This has increased by fully 15 per cent. over that done last year, and this despite the fact that the grain export has been practically nil. It is accounted for by the increased exports of cotton, and by the much larger general business to Spanish America, to Mediterranean ports and to South African points, as well as to the Baltic.

Farm Implements, owing to the fall in the price of cotton, are dubious for the future, but have been going splendidly for the past 30 days, with the outlook, until one week ago, roseate in the extreme.

Booming markets for heavier grades of iron and quickening prices in the general run of manufactured iron and steel goods, added to the sudden and tremendous slump in cotton, form conditions which have combined to create a peculiar outlook in the Hardware world of New Orleans and the country tributary thereto. However, the last 30 days has witnessed a greater volume of better business than any other 30 days in the six months immediately preceding. Furthermore, the business has been perceptibly better than it was during the same period in 1903.

Export and Local Trade.

Local trade has been exceptionally good during the fall, although builders' supplies have run behind 1903. However, general business in House Furnishing Goods, supplies to new establishments, &c., has run considerably ahead of the same period last season.

Woodward, Wight & Co. will soon have their own shipyard in active operation, with a floating dry dock that will accommodate all vessels up to 5000 tons burden, which means 80 per cent. of the shipping of the port. The Government dock will only receive the vessels which the private dock cannot accept.

Exports for the past 30 days have been excellent, and the chances are that during the winter they will largely increase over those of the same period in 1903.

Particular attention is being given in Hardware circles to the speech recently delivered in Pittsburgh by Hon. R. B. Armstrong, Assistant Secretary of the Treasury, anent the possibilities of the river, Gulf and Canal route from the headwaters of the Mississippi to the west coast of South America and the countries of the Pacific, Orient and tropical Pacific. Attention has also been given to the interview published from Col. W. P. Henburn of the House Committee on Interstate and Foreign Commerce relative to the comparatively ineffectual and misdirected efforts of American manufacturers and exporters to catch the eye and mind of the Spanish American would-be purchaser. However, there are many New Orleans manufacturers who are now seeking to enter the field of the Spanish Americas, and are awaiting eagerly the first chance to get a foothold in that territory.

That Slump in Cotton.

The vital question of the day just now with the wholesale and jobbing circles of the local Hardware world is just how much of the prospective winter trade will be taken away by the tremendous fall in the price of cotton since the announcement of the United States Government estimate, whereby the crop for 1904 was estimated at 12,162,000 bales—the world's record.

A sketch of conditions precedent to this event is, perhaps, necessary to an understanding of the situation through the cotton country, on which the bulk of New Orleans trade is based. In 1903 and the spring of 1904 the planters of the cotton belt, who are the producers of wealth in practically all of Mississippi, two-thirds of Louisiana, practically all the agricultural region of Alabama and the eastern section of Texas, were getting for their cotton 12.42 cents per pound, which made the price of the cotton crop, gross, $613,797,339—by odds the most valuable crop ever raised.

Thus far this year the amount of cotton actually sold is about 9,000,000 bales—sold by the planters or otherwise realized upon. This cotton has gone for prices ranging downward from 11 to 9 cents, thence down to 8 cents, with an average of about 9½, or $12.50 less per bale than the first 9,000,000 bales of last year's crop brought. Thus over $100,000,000 has already gone from what was the potential purchasing power of the cotton States at the opening of the season on September 1. On the remaining 3,000,000 bales the decrease in the price amounts to practically $25 per bale—or $75,000,000. However, this 3,000,000 bales is 2,000,000 more than last year, thus leaving a net loss to the planters of $25,000,000. Thus it is to be seen that there is a total loss in the purchasing power of the cotton belt of approximately $125,000,000 from that enjoyed and exercised by it in 1903. The late cotton is so distributed that the cotton territory tributary to New Orleans has a greater proportion of the loss than the Texas or the Atlantic States territory.

Will Not Hurt Hardware.

Despite this depreciation in purchasing power, collections to date have been very satisfactory, and as a general statement it can be said that the loss will fall entirely on the planter and not on the men who supply the cotton country, save in decreased volume of trade through the winter and spring. To-day the leading wholesale Hardwaremen in New Orleans declared that they looked for no great reduction in the volume of trade, and that they expected to feel no great injury.

JOHN D. SAWYER has disposed of his entire interest in Sawyer Hardware & Supply Company, dealer in Hardware and Mill Supplies, Pawtucket, R. I., of which he has been president and treasurer for the past 16 years, to Francis A. Adams of Attleboro, Mass., who will double the capital and continue the business at the old stand. Mr. Sawyer has retired from the retail Hardware business to devote his entire energy to the manufacture of Belt Hooks and Axe Wedges. He has been making these goods for several years past and advises us that they are meeting with a steadily increasing sale. With the exclusive attention he will now be able to give the business he expects to materially increase the output in the near future.

A NOTABLE EVENING AT LANDERS, FRARY & CLARK'S.

LANDERS, FRARY & CLARK, New Britain, Conn., made the opening of their great new factory building, Tuesday evening, December 6, an occasion long to be remembered by their employees, for it was marked by a social gathering at which the 1600 men and women whose names are on the company's pay roll were the guests. The great building was well adapted for the purposes of the evening. Flag and bunting draped walls converted the massive mill construction into a sumptuous theater, banquet hall and ballroom in the successive periods of the entertainment. Over the entrance was the welcoming sign emblazoned in electric light, "L., F. & C." Gov. Abiram Chamberlain of Connecticut and other prominent citizens were guests of the employees. The third and fourth floors were equipped as duplicate theaters, that all might enjoy the vaudeville and musical entertainment that opened the evening, the performers going from one hall to the other at the end of their turns, so that the shows were exact duplicates and of very excellent quality.

At intermission President Charles F. Smith and Treasurer George M. Landers of the company escorted Governor Chamberlain to the platform of one of the theaters and Mr. Smith introduced him to the assembly as an unexpected and more than welcome guest. The Governor spoke briefly and pleasantly, and then was escorted to the other hall, where he made another address. During his remarks he recalled pleasant memories of the former George M. Landers and the late Charles S. Landers during the years when the Governor himself was an employee and helped to manufacture New Britain Hardware. After the entertainment was concluded luncheon was served, the young ladies of the factory serving the guests. Then came dancing that lasted into the small hours of the morning. Altogether it was an evening that will long be remembered by those present.

Among the guests of the evening were representatives of the other great industries of New Britain, including P. Corbin, Charles M. Jarvis, A. N. Abbe, Charles Glover, C. A. Earl, H. S. Hart, B. A. Hawley, W. H. Hart, L. H. Pease, G. P. Hart, E. A. Moore, George W. Corbin, H. C. Noble, H. B. Humason, F. G. Platt, E. H. Davison, A. W. Stanley, C. E. Mitchell, R. N. Peck, J. B. Minor, M. L. Bailey, A. W. Rice, W. L. Humason, J. A. Traut, A. H. Abbe, H. L. Mills, W. H. Cadwell, H. Obershaw, Joshua Thornley, D. A. Parsons.

President Smith and Treasurer Landers received the guests and were active in their efforts to see that all had the best of good times. The arrangements were in the hands of the Foremen's Club, one of the active factors of the business, with President William H. Pease and Secretary and Treasurer William G. Burg in command, assisted by a number of subcommittees.

Joshua R. Thornley, an ex-foreman, contributed a poem, "A Song of the Cutlers," after Whittier's "Songs of Labor," dedicated to the Landers, Fray & Clark Foremen's Club, which follows, in part, including the greeting from the cutlers of this country to those of Sheffield, England:

For us the Oriental Turk
The emery rock is mining;
For us the white and yellow ores
The chemist is refining.

For us the sable ebon falls
By Madagascar's streams;
For us on giant, tropic palms
The Indian's hatchet gleams.

For us in northern forests dim
Are felled great oaks and beeches;
For us the apple's ruddy heart
The woodman's keen axe reaches.

For us the whaleman's daring crew
Grim Arctic peril braves;
For us the rainbow tinted shells
The dusky diver saves.

For us the lordly elephants—
The mighty sea-horse dies;
For us on southern pampas vast
The unerring lasso flies.

For us the "everlasting hills"
Give up their iron ore;
For us a hundred glowing kilns
Their molten metals pour.

For us by grace of fire and art
Base iron is "converted"
Material goods; so comrades hail!
Be all your plans concerted.

Vulcan, strike fair the glowing steel
And deftly shape the blade,
With taper true and temper good;
Do honor to your trade.
And you who run the ponderous stone,
The scintillating wheel,
Grind keen and true the cutting edge,
Bring out the polished steel.

Now bring to swift revolving saws
Fair ivory's beauteous grain,
The costly woods of India,
The treasures of the main,
The branching antlers of the stag,
The tinted Spanish horn,
Bring rainbow pearl with bands of gold,
For hafts of lovely form.

And artisans of cunning skill
Join haft and blade together;
Fitted so nice, secured so well,
Defying time and weather.
With speed that rivals glancing light
The humming wheels run faster;
Our work is finished smooth and bright,
Like polished alabaster.

* * * *

From Greenfield River's bosky banks
(Or Turner's classic fountain),
From modern Britain's Etna Works,
From Shelburne's glenny mountain,
From Meriden's fair Indian stream,
From Winsted's placid rills,
Or Naugatuck's swift, fickle tide
Pours down its verdant hills.
From Bay State, and from all our shops
Where cutler's work is done,
We send fair greeting o'er to thee,
Old Sheffield on the Don.

The new building is of the most substantial mill construction, five stories high and 50 x 160 feet. The lower floor is already in use for shipping purposes and the floor above for the laying out of orders and the storage of case goods. The third and fourth floors will be occupied for manufacturing purposes. The top floor will be devoted to the company's general offices and will be ready for occupancy soon after the new year. The present offices are not large enough for their purposes, and the new quarters will prove a great convenience as well as affording sumptuous and well lighted and ventilated environments.

MILLER-MORSE HARDWARE COMPANY.

MILLER, MORSE & CO., wholesale Hardware and Iron merchants, Winnipeg, Man., who for the past 23 years have operated under that style, have recently incorporated under the name of Miller-Morse Hardware Company, with a capital of $1,000,000. The new organization goes into effect January 1, when the new premises which have been in course of erection during the year will be occupied. The dimensions of the new building are 84 x 265 feet, five stories and basement. It is of mill construction throughout. On one side of the building is a C. P. R. R. track for loading and unloading cars, and on the opposite side are six shipping doors for the purpose of shipping L. C. L. lots. With the improved facilities thus secured the company expects to materially increase its business and thus keep pace with the development and growing demands of the Canadian Northwest.

CALENDARS, &c.

E. C. ATKINS & Co., Indianapolis, Ind.: Hanger calendar for 1905.

POPE MFG. COMPANY, 21 Park row, New York: Desk calendar for 1905, containing a memorandum leaf for every day in the year.

BUILDERS IRON FOUNDRY, Providence, R. I.: A neat 12-inch Ruler, with two metal edges.

HARRINGTON & RICHARDSON ARMS COMPANY, Worcester, Mass.; An attractive hanger calendar for 1905, which will be mailed on application to those who mention *The Iron Age* in connection with their request.

THE JOHNSTON HARVESTER COMPANY, Batavia, N. Y.: Hanger calendar for 1905.

ALMON H. FOGG COMPANY, Houlton, Maine.: Small hanger calendar for desk use.

BRITISH LETTER.

Offices of *The Iron Age*, Hastings House, 10 Norfolk St., London, W. C., December 3, 1904.

The Week's Hardware Trade.

In Sheffield Cutlery and Plate manufacturers are coming to the end of their season orders from the retail trade in view of the Christmas demand, and unless the shopkeepers find business brisk, and think it desirable to carry full stocks right up to Christmas and the New Year, the manufacturers may be compelled to slacken their efforts and provide a smaller amount of employment just at the very period when it is most needed by their work people. There is no improvement in the Edge Tool trade, but makers of Spades, Shovels and Mining and Navvying Implements generally are doing fairly well. In and around Birmingham the greatest activity is in the heavy industries; in the lighter industries there is nothing fresh to record. The continued upward range in the price of copper and spelter is bringing about the revision of other price-lists for finished articles. A meeting of the makers of Brass Water Fittings is reported, at which it was decided to notify an advance of 10 per cent. throughout the whole of the trade. Gas Fittings makers also announce an increase of 5 per cent. in net prices and a reduction of 2½ per cent. in discounts. These changes are due almost entirely to the advance in copper, which is still gradually creeping up to the level at which American producers maintained it for so long, but here and there a slight increase in the volume of employment is reported. Of itself, however, this latter does not appear to be sufficient to justify such notifications. Military Gun and Ammunition makers are now well occupied, and there is a very well maintained demand for Sporting Ammunition, but Sporting Guns are in very indifferent request. On overseas account some fair lines are arriving from Australia and New Zealand, South America appears to be a good market, but the Canadian demand is falling off.

The Scottish Tube Trade.

The affairs of the Scottish Tube trade would appear to be in an unhappy condition. Several attempts to reach an understanding between the various makers have failed, with the result that at the present moment competition has reduced prices to the lowest level on record, so low, indeed, that it is alleged Tubes are being sold under cost prices. Boiler Tubes are selling in the Clyde Valley at 73¾ per cent. discount, less 2½ per cent. for cash. The prices are even lower on export account. The makers are divided into two or three camps, and whichever way we turn there seems no hope of peace. Efforts have recently been made to effect another working agreement, but, disgusted with past efforts, no one seems disposed to make any change.

C.I.F. or C I.F.C. ?

The question has again been raised as to the wisdom of quoting c.i.f. and c.i.f.c. (cost, insurance, freight, commission). The point urged by a firm of exporters is the liability of a merchant, misled by *pro forma* invoices, to execute an order on c.i.f.c. terms under the belief that it is to be at c.i.f. rates. When, too late, he discovers this he of course advises his client of future rates. On receipt of this advice the dealer, nothing disconcerted, offers his business in the line at the former prices to the agent of some other merchant, proving the *bona fides* of the rates offered by showing the original invoice, and the second house learns in turn by experience that things are not always what they seem. In such a port as Bombay, for instance, this game can be and has been played with a dozen different concerns, the result being a large number of profitless transactions, a permanent reduction of prices, and a growth of ill feeling and mutual suspicion between the export houses. The following precautions are recommended to obviate innocently created unfair competition:

1. All c.i.f. invoices should be checked by complete cost calculations before they are sent with the documents to the bank for collection.

2. Where it is found that the price obtained has not been satisfactory the words "This item cannot be repeated under ———— in future" should be written in red ink across the face of every copy of the sales invoice in such a manner that the latter cannot be shown without these words being seen.

CHINESE DEMAND FOR GARDEN IMPLEMENTS.

The American Consul at Hangchow, China, states that while there will be little demand for agricultural machinery in China for a long time to come, excepting in Manchuria and Northern China, it is probable that modern American garden implements will soon be welcomed and that there will be a wide field for enterprise in this line. At present the native tools are such as have been in use for centuries. They are not good tools, perhaps, but they are made cheaply and are used by cheap labor. In several instances within his observation small garden Force Pumps have been welcomed by progressive gardeners, and he is of the opinion that small garden Hand Plows will also be well received. It is possible that cheap but substantial American Rakes and Hoes could be sold. It is well to bear in mind that the general introduction of a single one of these articles in China would mean the sale of an immense number. Chinese farmers are commencing to consider foreign ideas and methods, and there will soon be a breaking up of present methods and a turning to new tools. All land culture in China is intensive and the tools must suit intensive methods of farming.

MISCELLANEOUS NOTES.

Machine Taps.

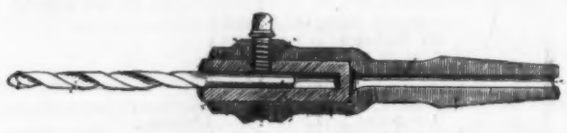
The Reed & Prince Mfg. Company, Worcester, Mass., has begun the manufacture of a full line of machine taps. The company manufactures wood screws, machine screws and kindred lines. It was found desirable to furnish taps standard with the company's line of machine screws, which led to the new product.

Bowers File and Tool Holders.

George W. Bowers Mfg. Company, Boston, Mass., is successor to George W. Bowers, Waltham, Mass., continuing the manufacture of the Bowers file and tool holders and thief proof cabinets. The holder has a capacity of 47 files or tools and occupies a space on the wall, to which it is easily attached, of about 15 x 6 inches when closed. The holder is offered as saving the workman's time, keeping benches clean and orderly and returning its cost in tools and work in a short time. Its adaptability for window display purposes is also pointed out. The thief proof cabinet is nicely made of sheet metal and is furnished with padlock or Yale snap lock.

Brace Chuck, Style B.

Imboden Harrow & Roller Company, Lebanon, Pa., is introducing the brace chuck of which the interior arrangement is shown in the accompanying cut. The chuck is provided with five sleeves, drilled in different gauges, to hold tools down to 1-16 inch in diameter. When using ½-inch shank no sleeve is necessary. The



Brace Chuck, Style B.

set screw passes part way through the sleeve, so that when changing tools the sleeve will stay in position, even if the chuck is held perpendicularly. To remove the sleeve the set screw is turned backward until out of the hole in the sleeve. Tools are centered as soon as firmly secured in place by the set screw. The chuck has a hole clear through its shank, so that if the tool or sleeve should stick it can be pushed out with a pin provided for this purpose. The set screw has a collar to prevent

the wrench falling or slipping over the head. The chuck will hold drills, reamers, taps, rods, countersinking and wood boring tools, wood augers, if the square shank is twisted off, and round drills whose shanks are broken off. This permits the mechanic to use the same tools with a brace that he uses on his machines. The chuck is 3½ inches long, nickel plated steel, and is packed in a sliding cover wooden box, with wrench, pin and five sleeves, weighing complete about 12 ounces. This permits the set to be carried in the pocket or tool chest without the liability of losing any of the parts. Every set is warranted by the manufacturer.

The Kimball Boring Tool Holder.

The tool holder shown in Fig. 1 is designed to effect a saving of steel by the use of small shanked tools, and, also, by its ability to set a tool slightly out of line, to produce an effective boring instrument for very small sizes of holes. The top bar is slightly bowed, bringing the grip firmly at both ends, thus preventing spring, which

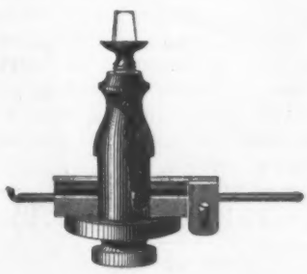


Fig. 1.—The Kimball Boring Tool Holder.

is the secret of the efficiency of the tool holder, this rigidity doing away with the necessity of the big end of the tool. Naturally a saving is obtained in the cost of forging tools, especially special tools. The tool holder

Fig. 2.—Set of Boring Tools and Tool Holder.

will take tools and twist drills from ¼ to ½ inch diameter. The drills are used for centering work, for drilling holes, or for boring, by setting the tool slightly out of line, one lip making an effective boring tool. For instance, a ¼-inch drill makes an efficient boring tool for a 17-64-inch hole, which is too small to be bored by an ordinary shop device. By forging down a ¼-inch rod a boring tool for ⅛ or 3-16 inch hole may be had. Used as an ordinary tool post the tool may be set very close to the work. Five sizes of boring tools, one centering tool and a tool holder are put in sets, as shown in Fig. 2. The device is manufactured by the F. W. Mann Company, Milford, Mass.

Detachable and Riveted Sprocket Chain.

The Baldwin Chain & Mfg. Company, Worcester, Mass., is putting on the market a new detachable and riveted sprocket chain for automobile and machinery uses,

Fig. 1.—Detachable and Riveted Sprocket Chain.

as shown in the accompanying illustrations. It has no cotter pins. Each stud is riveted on one end, on alternate sides. The links are extended to make it impossible for them to slide together, and cannot be detached except when placed in position, as shown in Fig. 2. The extended form of the side links limits the lateral motion of

Fig. 2.—Construction of Sprocket Chain.

the chain, which is a tendency coming with long usage. The rounded inner edges help the chain to find its place on the sprockets, which is especially valuable when the sprockets are not in exact alignment, and there are no square corners for the sprocket teeth to strike.

Ducharmes Nail Set and Belt Awl.

The nail set and belt awl shown herewith are new articles offered by Ducharmes & Co., Shelburne Falls, Mass. The nail set, Fig. 1, is made from finest Sander-

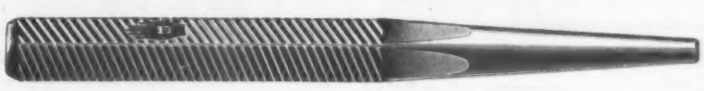


Fig. 1.—Ducharmes Perfect Nail Set.

son steel, hammer forged, with cup point, corrugated grip, and is warranted to stand hard usage. The belt awl, Fig. 2, has a thin, tapered blade and is provided

Fig. 2.—Ducharmes Belt Awl.

with a fluted handle. Both tools bear the company's trade-mark, Hand D, which is a guarantee that the tools are made from the very best stock.

Autolyte Acetylene Gas Generator.

A. H. Funke, 83 Chambers street, New York, manufacturer of the Baldwin acetylene lamps for automobiles, bicycles, motor cycles and launches, has just put on the market the Autolyte generator here illustrated, which, while suitable for generating acetylene gas from calcium carbide for many purposes, is especially recommended for use in automobiles for supplying the lamps with illuminating gas. Fig. 1 shows the generator com-

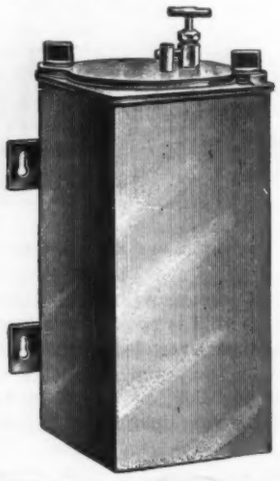


Fig. 1.—Autolyte Acetylene Gas Generator.

plete, Fig. 2 being a sectional view of it. It is made of brass, in two sizes, Nos. 15 and 16, holding respectively 1 and 2 pounds of carbide, the dimensions being 4¾ x 10 inches and 6 x 10 inches, respectively. Referring to Fig. 2, the outside bell of the generator M is brought down to the bottom of the water reservoir, forming a space, S, between the bottom of the carbide box P and the bot-

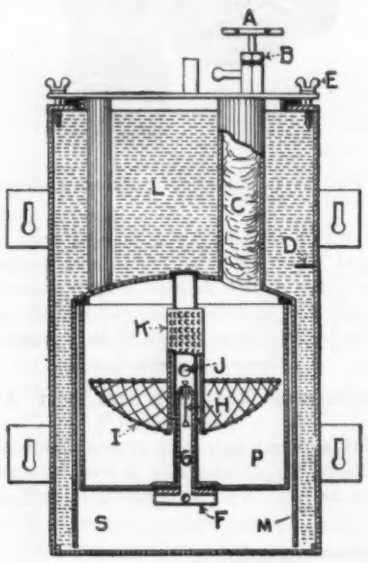


Fig. 2.—Sectional View of Generator.

tom of the water tank. When the generator, after being charged with carbide, is immersed in the water the outside bell of the generator M serves as a diving bell, the air keeping the water out from underneath. On reaching the bottom of the water tank all the water is driven away, so that there is no water at all beneath the generator, all being on top, as shown in Fig. 2, thus making it impossible for water to reach the carbide. The manufacturer asserts that this generator can be charged with carbide and water, and so remain for months without loss of gas. When the cock A is opened the air escapes, and the water rises in space S up tube G, through hole J, into the carbide. Should gas be generated too quickly the water is forced down and out of tube G, the space S acting as a reservoir for the extra gas, which, when the action becomes normal, returns into the generator and is burnt up instead of escaping into space and producing an unpleasant odor. The manufacturer refers to the construction of the generator as mechanically correct and of a high order.

The White Mop Wringer.

The mop wringer shown herewith hangs inside of any mop bucket without any fastening screws or clamps. It receives the mop at the top, and when the handle of the wringer is carried down near the top of the bucket, 25 pounds pressure on the handle places a pressure of 400 pounds on the mop. This is referred to as a comparatively powerful purchase and pressure for mop wringers. The pressure is brought to bear by a squeeze between two walls, without rolls, which does not tear or pull the mop, effecting a great saving in mop material. The pressure wrings the mop exceedingly dry, enabling the operator to dry the floor in a satisfactory manner, quickly and

The White Mop Wringer.

Wringer in Use.

with little effort. Every part of the mop is thoroughly wrung, it is explained, the ends included. The wringer is made of the best malleable castings, while the wooden parts are of best maple and birch, nicely finished. The wringers are manufactured by the White Mop Wringer Company, formerly of Jamaica, Vt., and now at Fultonville, N. Y. The company's mop wringers received diploma and highest award at the recent Louisiana Purchase Exposition.

The Twentieth Century White Flame Gas Burner.

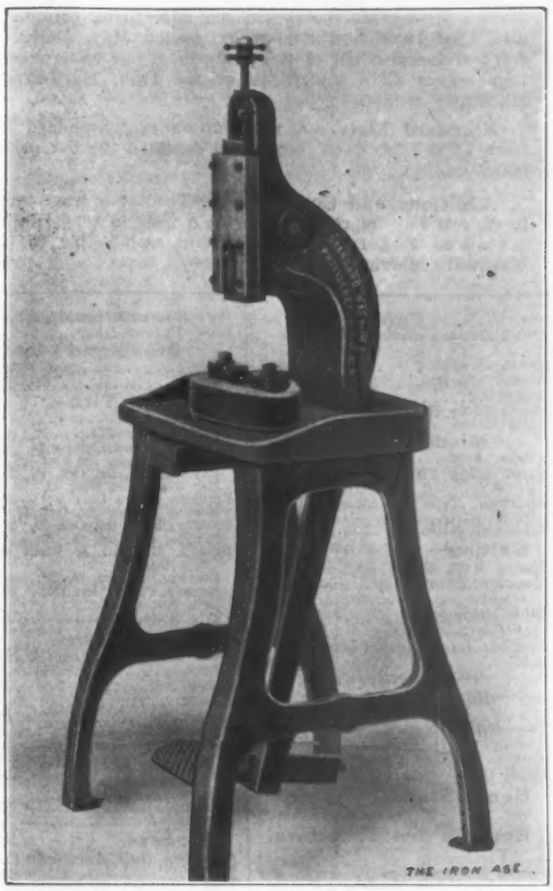
The Twentieth Century Mfg. Company, 19 Warren street, New York, foreign office, 114 Fore street, London, E. C., England, is offering the combination gas burner shown in the accompanying cut. The device attaches without trouble to any chandelier, wall bracket or porta-

The Twentieth Century White Flame Gas Burner.

ble gas stand, and gives both heat and light at one cost, it is remarked, as it is perfect in combustion, the white flame burning all the gas, leaving none to waste or breathe. The burner is 8½ inches in diameter, and folds into small space to carry when traveling. The device is designed for use in bath and living rooms, in cases of sickness, in hotel rooms, or wherever supplementary heat is needed.

Standard Machinery Company's Foot Press.

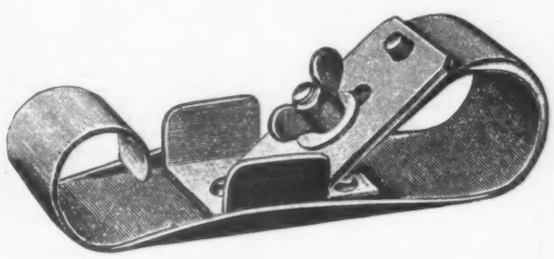
The foot press shown in the accompanying illustration is designed for such light work as is frequently necessary in hardware manufacturing establishments, as well as in other lines of manufacture. Very powerful leverage is obtained from the location of the fulcrum and the form of the swinging pendulum, the ratio of leverage at the top of the stroke being 11 to 1 and at the bottom 13½ to 1. The slide block may be removed, being locked into place by means of a latch actuated by the handle at the front. By removing the block the slide may be raised for easier removal or insertion of the tool. The length of stroke is regulated by the screw and hand nuts at the top of the press, while the angle of the treadle is adjustable. The gap is high and open at the sides to admit of ample light. The machine is manufactured by the Standard Machinery Company, Providence, R. I.



Standard Machinery Company's Foot Press.

Payson's Toboggan All Steel Plane.

Payson Specialty Company, 16-18 South Canal street, Chicago, Ill., is manufacturing a unique all steel Toboggan plane, as here shown, it being marketed in Eastern territory by Frederick Pfeifer, 88 Chambers street, New York. The body of the plane is formed from a single piece of steel, and derives its name from the similarity it bears to a toboggan. It is 7¼ inches long over all, 2½ inches wide, and takes a 1⅝-inch bit, made of best English steel, carefully tempered, every plane being warranted. The plane is designed as an all around tool for the carpenter, farmer, householder or amateur, either as a bench or smoothing plane, or, held in one hand, for blocking the ends of work, &c., and especially for such as wish to own a serviceable plane at a moderate price. It weighs, complete, about 17 ounces.



Payson's Toboggan All Steel Plane.

Carolina Hardware Company, Raleigh, N. C., has been chartered with an authorized capital of $75,000. The company is successor to R. E. Prince, and will continue the wholesale and retail business in Shelf and Heavy Hardware, Stoves, Paints, Sporting Goods, &c.

PAINTS, OILS AND COLORS

White Lead, Zinc, &c.—

	₱ lb
Lead, English white, in Oil	9⅛@ 9¼
Lead, American white, in Oil:	
Lots of 500 lb or over	@ 6½
Lots less than 500 lb	@ 7
In Barrels	@ 6
Lead, White, in oil, 25 lb tin pails, add to keg price	@ ⅛
Lead, White, in oil, 12½ lb tin pails, add to keg price	@ 1
Lead, White, in oil, 1 to 5 lb ass'ted tins, add to keg price	@ 1½

Lead, American. Terms: For lots 12 tons and over ¼¢ rebate; and 2% for cash if paid in 15 days from date of invoice; for lots of 500 lbs. and over 2% for cash if paid in 15 days from date of invoice, for lots of less than 500 lbs. net.

	₱ lb
Lead, White, Dry in bbls	@ 6
Zinc, American, dry	4⅝@ 4¾
Zinc, French:	
Paris, Red Seal, dry	6½
Paris, Green Seal, dry	9%
Antwerp, Red Seal, dry	7½
Antwerp, Green Seal, dry	8⅞
Zinc, V. M. French, in Poppy Oil:	
Green Seal:	
Lots of 1 ton and over	11⅞@12%
Lots of less than 1 ton	12⅛@12%
Zinc, V. M. French, in Poppy Oil:	
Red Seal:	
Lots of 1 ton and over	10⅝@11¼
Lots of less than 1 ton	10⅞@11⅝

Discounts.—French Zinc.—Discounts to buyers of 10 bbl. lots of one or mixed grades, 1%; 25 bbls., 2%; 50 bbls., 4%.

Dry Colors—

	₱ lb
Black, Carbon	5 @10
Black, Drop, Amer	4 @ 6
Black, Drop, Eng	5 @15
Black, Ivory	16 @20
Lamp, Com	4½@ 6
Blue, Celestial	4 @ 6
Blue, Chinese	@32
Blue, Prussian	27 @30
Blue, Ultramarine	4½@15
Brown, Spanish	½@ 1
Carmine, No. 40	$3.50@4.00
Green, Chrome, ordinary	3½@ 6
Green, Chrome, pure	17 @25
Lead, Red, bbls., ½ bbls. and kegs:	
Lots 500 lb or over	@ 6½
Lots less than 500 lb	@ 7
Litharge, bbls., ½ bbls. and kegs:	
Lots 500 lb or over	@ 6½
Lots less than 500 lb	@ 7
Ocher, American	₱ ton $8.50@16.00
Orcher, American Golden	2½@ 3½
Orcher, French	1¾@ 2¼
Orcher, Foreign Golden	3 @ 4
Orange Mineral, English	8¾@10½
Orange Mineral, French	10½@11¼
Orange Mineral, German	7 @10
Orange Mineral, American	8 @ 8¼
Red, Indian, English	4½@ 8½
Red, Indian, American	3 @ 3¼
Red, Turkey, English	4 @10
Red, Tuscan, English	7 @10
Red, Venetian, Amer.	₱ 100 lb $0.50@1.25
Red Venetian, English	100 lb $1.15@1.75
Sienna, Italian, Burnt and Powdered	3 @ 9½
Sienna, Ital., Raw, Powd	3 @ 6½
Sienna, American, Raw	1½@ 2
Sienna, American, Burnt and Powdered	1½@ 2
Talc, French	₱ ton $20.00@30.00
Talc, American	₱ ton $13.75@25.00
Terra Alba, French	₱ 100 lb 90 @1.00
Terra Alba, English	₱ 100 lb 90 @1.00
Terra Alba, American	₱ 100 lb No. 1..60 @70
Terra Alba, American	₱ 100 lb No. 2..45 @50
Umber, T'key, Brt. & Pow	2½@ 3½
Umber, Turkey, Raw & Pow	2½@ 3½
Umber, Burnt, Amer	1½@ 2
Umber, Raw, Amer	1½@ 2
Yellow, Chrome	11 @14
Vermilion, American Lead	10 @25
Vermilion, Quicksilver, bulk	@65
Vermilion, Quicksilver, bags	@66
Vermilion, English, Import	75 @80
Vermilion, Chinese	$0.90@1.00

Colors in Oil—

	₱ lb
Black, Lampblack	12 @14
Blue, Chinese	36 @46
Blue, Prussian	32 @36
Blue, Ultramarine	13 @16
Brown, Vandyke	11 @14
Green, Chrome	10 @15
Green, Paris	@24
Sienna, Raw	12 @15
Sienna, Burnt	12 @15
Umber, Raw	11 @14
Umber, Burnt	11 @14

Miscellaneous—

Barytes, White, Foreign	₱ ton $17.50@20.00
Barytes Amer. floated	₱ ton 16.00@17.00
Barytes, Crude, No. 1	₱ ton 10.00@11.00
Chalk, in bulk	₱ ton 3.00@ 3.25
Chalk, in bbls	₱ 100 lb @ .35
China Clay, English	₱ ton 11.00@17.50
Cobalt, Oxide	₱ 100 lb 2.50@ ....
Whiting, Common	₱ 100 lb .35@ .48
Whiting, Gilders	₱ 100 lb .55@ .57
Whiting, Ex. Gilders	₱ 100 lb .58@ .60

Putty—

	₱ lb
In bladders	1½@2
In bulk	₱ 100 lb 1.05@1.15
In cans, 1 lb to 5 lb	2¾@4
In cans, 12½ to 25 lb	1¾@2

Spirits Turpentine—

	₱ gal.
In Oil bbls	50½@51
In machine bbls	51 @51½

Glue—

	₱ lb
Cabinet	11 @15
Common Bone	6 @ 8
Extra White	18 @24
Foot Stock, White	11 @14
Foot Stock, Brown	7 @10
German Hides	12 @18
French	10 @40
Irish	13 @16
Low Grade	8 @11
Medium White	14 @17

Gum Shellac—

	₱ lb
Bleached Commercial	43 @44
Bone Dried	53 @54
Button	45 @60
Diamond I	59 @..
Fine Orange	52 @54
A. C. Garnet	45 @46
D. C	1.00 @..
Octagon B	54 @55
T. N	49 @52
V. S. O	60 @..

Animal, Fish and Vegetable Oils—

	₱ gal.
Linseed, City, raw	41 @42
Linseed, City, boiled	43 @44
Linseed, State and West'n, raw	40 @41
Linseed, raw Calcutta seed	@55
Lard, Prime, Winter	58 @59
Lard, Extra No. 1	48 @49
Lard, No. 2	36 @38
Cotton-seed, Crude, f.o.b. mills	17½@18½
Cotton-seed, Summer Yellow, prime	24½@25
Cotton-seed, Summer Yellow, off grades	24½@25
Sperm, Crude	50 @..
Sperm, Natural Spring	53 @55
Sperm, Bleached Spring	57 @58
Sperm, Natural Winter	55 @56
Sperm, Bleached Winter	58 @59
Tallow, Prime	48 @50
Whale, Crude	@..
Whale, Natural Winter	45 @..
Whale, Bleached Winter	47 @..
Menhaden, Brown, Strained	27 @28
Menhaden, Light, Strained	28 @29
Menhaden, Bleached Winter	30 @32
Menhaden, Ex-Bld. Winter	32 @33
Menhaden, Southern	19½@20
Cocoanut, Ceylon	₱ lb 6¾@ 7
Cocoanut, Cochin	₱ lb 7½@ 7¾
Cod, Domestic	34 @36
Cod, Newfoundland	39 @41
Red Elaine	32 @33
Red Saponified	₱ lb 4¾@ 5
Olive, Italian, bbls	52 @55
Neatsfoot, prime	50 @51
Palm, prime Logos	₱ lb 5¾@ 6

Mineral Oils—

	₱ gal.
Black, 29 gravity, 25@30 cold test	11 @12
Black, 29 gravity, 15 cold test	12 @13
Black, Summer	11 @12
Cylinder, light filtered	18½@19½
Cylinder, dark filtered	16½@17½
Paraffine, 903-907 gravity	13 @13½
Paraffine, 903 gravity	12 @12½
Paraffine, 883 gravity	9¾@10
Paraffine, red	12 @13¾

In small lots ½¢ advance.

Current Hardware Prices.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer—are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33⅓ @ 33⅓ & 10% signifies that the price of the goods in question ranges from 33⅓ per cent. discount to 33⅓ and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued May, 1904, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—

Domestic, ℔ doz. $3.00.....33⅓%
North's 10%
Zimmerman's—See Fasteners, Blind.

Window Stop—

Ives' Patent.....35%
Taplin's Perfection.....35%

Ammunition—See *Caps, Cartridges, Shells, &c.*

Anvils—American—

Eagle Anvils.....℔ lb 7¼@7¾¢
Hay-Budden, Wrought.....8@9¼¢
Horseshoe brand, Wrought.....8@9¼¢
Trenton .....℔ lb 9@9¼¢

Imported—

Peter Wright & Sons.....℔ lb 10½¢

Anvil, Vise and Drill—

Millers Falls Co., $18.00.....15&10%

Apple Parers—See *Parers, Apple, &c.*

Aprons, Blacksmiths'—

Hull Bros, Co.....30&10%
Livingston Nail Co.....33⅓%

Augers and Bits—

Com. Double Spur....75@75&10%
Boring Mach. Augers.70&10@75%
Car Bits, 12-in. twist..60@60&10%
Jennings' Pattern..60&10&10@70%
Ford's Auger and Car Bits.....40&5%
Forstner Pat. Auger Bits.....25%
C. E. Jennings & Co.:
No. 10 ext. lip. R. Jennings' list..25%
No. 30, R. Jennings' list.....40&7½%
Russell Jennings'.....25&10&2½%
L'Hommedieu Car Bits.....15%
Mayhew's Countersink Bits.....15%
Millers Falls.....50&5&7½%
Ohio Tool Co.'s Bailey Auger and Car Bits.....40&10%
Pugh's Black.....30%
Pugh's Jennings' Pattern.....35%
Snell's Auger Bits.....60%
Snell's Bell Hangers' Bits.....60%
Snell's Car Bits, 12-in. twist...60&10%
Wright's Jennings' Bits (R. Jennings' list) 50%

Bit Stock Drills—See *Drills, Twist.*

Expansive Bits—

Clark's small, $18; large, $26....50&10%
Clark's Pattern, No. 1, ℔ doz. $26;
No. 2, $18.....50&10%
Ford's, Clark's Pattern.....50&10@60%
C. E. Jennings & Co., Steer's Pat..25%
Swan's 60%

Gimlet Bits—

Common Dble. Cut.gro.$3.00@3.25
German Pattern....gro.$4.50@4.75

Hollow Augers—

Bonney Pat., per doz..$9.00@10.00
Ames .....25&10%
New Patent.....25&10%
Universal 20%
Wood's Universal.....25%

Ship Augers and Bits—

Ford's 40%
C. E. Jennings & Co.:
L'Hommedieu's 15%
Watrous' .....35&5%
Ohio Tool Co.'s.....40%
Snell's 40%

Awl Hafts—See *Hafts, Awl.*

Awls—

Brad Awls:
Handled .....gro. $2.75@3.00
Unhdld, Shldered...gro.63@66¢
Unhandled, Patent..gro.66@70¢
Peg Awls:
Unhandled, Patent..gro. 31@34¢
Unhdld, Shldered..gro. 65@70¢
Scratch Awls:
Handled, Com...gro. $3.50@4.00
Handled, Socket..gro.$11.50@12.00
Hurwood 40%

Awl and Tool Sets—See *Sets, Awl and Tool.*

Axes—

Single Bit, base weights. (up to 3½ lb.)
First Quality.....$6.50
Second Quality.....$5.75
NOTE.—Heavier Weights add Extras as per regular schedule.

Axle Grease—See *Grease, Axle*

Axles—*Iron or Steel*

Concord, Loose Collar...4¼@4¾¢
Concord, Solid Collar...4¾@5¼¢
No. 1 Common, Loose...3¼@3¾¢
No. 1½ Com., New Style3¾@4¼¢
No. 2 Solid Collar.....4@4½¢
Nos. 7, 8, 11 and 12....75@75&5%
Nos. 13 to 14.....70&10@75&5%
Nos. 15 to 18.....75&10@75&10&5%
Nos. 19 to 22.....75&10@75&10&5%

Boxes, Axle—

Common and Concord, not turned lb., 5¼@5¾¢
Common and Concord, turned. lb., 5½@6¢
Half Patent.....lb. 8½@9¢

Bait—Fishing—

Hendryx:
A Bait.....20%
B Bait.....25%
Competitor Bait.....20&5%

Balances—Sash—

Caldwell new list.....50%
Pullman .....50&10@60%

Spring—

Spring Balances.....60@60&5%
Chatillon's:
Light Spg. Balances.....40&10%
Straight Balances.....40%
Circular Balances.....50%
Large Dial.....30%

Barb Wire—See *Wire, Barb.*

Bars—Crow—

Steel Crowbars, 10 to 40 lb.... per lb. 2½@2¾¢

Towel

No. 10 Ideal, Nickel Plate..℔ gro. $8.50

Beams, Scale—

Scale Beams.....40&10@50%
Chattillon's No. 1.....30%
Chattillon's No. 2.....40%

Beaters, Carpet—

Holt-Lyon Co.:
No. 12 Wire Coppered ℔ doz. $0.85; Tinned $1.00
No. 11 Wire Coppered ℔ doz. $1.10; Tinned $1.20
No. 10 Wire Galvanized..℔ doz. $1.75
Western W. G. Co.:
No. 1 Electric.....℔ gro. $7.80
No. 2 Buffalo.....℔ gro. $9.00
No. 3 Perfection Dust.....℔ gro. $8.00

Egg—

Holt-Lyon Co.:
Holt, No. A, Japanned....℔ doz. $1.20
Holt, No. 1, Tinned.....℔ doz. $1.50
Holt, No. B, Japanned....℔ doz. $2.00
Holt, No. 2, Tinned.....℔ doz. $2.25
Lyon, No. 2, Japanned....℔ doz. $1.25
Lyon, No. 3, Japanned....℔ doz. $1.50
Taplin Mfg. Co.:.....℔ gro.
No. 60 Improved Dover.....$6.00
No. 75 Improved Dover.....$6.50
No. 100 Improved Dover.....$7.00
No. 102 Improved Dover, Tin'd..$8.50
No. 150 Improved Dover, Hotel..$15.00
No. 152 Imp'd Dover, Hotel, T'd.$17.00
No. 200 Imp'd Dover Tumbler....$8.50
No. 202 Imp'd Dover Tumbler, T'd.$9.50
No. 300 Imp'd Dover Mammoth, ℔ doz. $25.00
Western, W. G. Co., Buffalo.....$7.00
Wonder (S. S. & Co.).℔ gro. net, $6.00

Bellows—

Blacksmith, Standard List.. 60&10@70&10%

Blacksmiths'—

Inch..	*30*	*32*	*34*	*36*	*38*	*40*
Each.	*$3.25*	*3.50*	*4.00*	*4.50*	*5.00*	*5.75*

Extra Length:

Each.	*$3.75*	*4.25*	*4.75*	*5.25*	*6.00*	*7.00*

Hand—

Inch...	*6*	*7*	*8*	*9*	*10*
Doz...	*$4.50*	*5.00*	*5.50*	*6.00*	*6.50*

Molders—

Inch.	*9*	*10*	*11*	*12*	*14*
Doz.	*$8.00*	*9.00*	*10.50*	*12.50*	*14.50*

Net Prices.

Bells—Cow—

Ordinary goods...75&5@75&10&5%
High grade.....70&10@70&10&5%
Jersey .....75&10%
Texas Star.....50%

Door—

Abbe's Gong.....45%
Burton Gong.....50%
Home, R. & E. Mfg. Co.'s.....55&10%
Lever and Pull, Sargent's....60&10&10%
Trip Gong.....50&10@50&10&5%
Yankee Gong.....55%

Hand—

Hand Bells, Polished, Brass.. 60&5@60&10&5%
White Metal.....60%
Nickel Plated....50&10@50&10&5%
Swiss .....60@60&7½%
Cone's Globe Hand Bells.....33⅓@35%
Silver Chime.....33⅓@35%

Miscellaneous—

Farm Bells.....lb. 2¼¢
Steel Alloy Church and School 50&10&5@60&5%
American Tube & Stamping Co. Gongs 75%
Table Call Bells.....50@60&10%

Belting—Leather—

Extra Hvy, Short Lap.60@60&5%
Regular Short Lap...65&10@70%
Standard .....70&5@70&10%
Light Standard.....70&10@75%
Cut Leather Lacing.....60&10%
Leather Lacing Sides, per sq. ft. 17½@18¢

Rubber—

Agricultural (Low Grade).... 75@75&5%
Common Standard....70@70&10%
Standard .....65&70%
Extra .....60&5@60&10%
High Grade.....50&5@50&10%

Bench Stops—See *Stops, Bench*

Benders and Upsetters, Tire—

Detroit Perfected Tire Bender.....40%
Green River Tire Benders and Upsetters 20%
Detroit Stoddard's Lightning Tire Upsetters, No. 1, $4.25; No. 2, $7.25; No. 3, $10.50; No. 4, $16.25; No. 5, $20.50.

Bicycle Goods—

John S. Leng's Son's 1902 list:
Chain 50%
Parts 50%
Spokes 50%
Tubes 60%

Bits—

Auger, Gimlet, Bit Stock Drills, &c.—See *Augers and Bits.*

Blocks—Tackle—

Common Wooden....70&10@75&5%
Hartz St, Tackle Blocks.....50@50&5%
Hollow Steel Blocks, with Ford's Patent Sheaves.....50&10%
Lane's Patent Automatic Lock and Junior 30%
Stowell's Novelty Mal. Iron....50&10%
Stowell's Self Loading.....60%
See also Machines, Hoisting.

Boards, Stove—

Zinc, Crystal, &c...30&10@40&10%

Boards, Wash—See *Washboards.*

Bobs, Plumb—

Keuffel & Esser Co.....33⅓%

Bolts—Carriage, Machine, &c.—

Common Carriage:
⅜ x 6 and Smaller...75&10@80%
Larger sizes.....75@75&5%
Phila. Eagle $3.00 list May 2½,'99 80&10%
Bolt Ends, list Feb.1½,'95.75@75&5%
Machine, ⅜ x ¼ and smaller 75&10&5%
Machine, larger and longer.75&5%

Door and Shutter—

Cast Iron Barrel, Japanned, Round Brass Knob:

Inch.....	*3*	*4*	*5*	*6*	*8*
Per doz..	*$0.30.*	*.96*	*.45*	*.56*	*.75*

Cast Iron Spring Foot, Jap'd:

Inch.....	*6*	*8*	*10*
Per doz.....	*$1.15*	*1.40*	*2.00*

Cast Iron Chain, Flat, Japanned:

Inch.....	*6*	*8*	*10*
Per doz.....	*$0.95*	*1.25*	*1.55*

Cast Iron Shutter, Japanned, Brass Knobs:

Inch.....	*6*	*8*	*10*
Per doz.....	*$0.80*	*.90*	*1.20*

Wrt Barrel Japd.....80@80&10%
Wrt " Bronzed....50@50&10%
Wrt. Spring...70&10@70&10&10%
Wrt. Shutter.....50&5@50&10&5%
Wrt. Square Neck....75@75&10%
Wrt Square.66⅔&10@66⅔&10&10%
Ives' Patent Door.....60%

Stove and Plow—

Plow .....70&10@70&10&5%
Stove .....82½@82½&5%

Tire—

Common 72½%
Norway Iron.....80%
American Screw Company:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84...82½%
Bay State, list Dec. 28, '99.....72½%
Franklin Moore Co.:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84....82½%
Eclipse, list Dec. 28, '99.....72½%
Russell, Burdsall & Ward Bolt & Nut Co.:
Empire, list Dec. 28, '99.....72½%
Norway Phila., list Oct., '84.....80%
Upson Nut Co.:
Tire Bolts.....72½%

Borers, Tap—

Borers Tap, Ring, with Handle:

Inch.....	*1¼*	*1½*	*1¾*	*2*
Per doz...	*$4.30*	*5.00*	*5.75*	*7.25*
Inch	*2¼*	*2½*		
Per doz.....	*$6.65*	*11.50*		

Enterprise Mfg. Co., No. 1, $1.25; No. 2, $1.65; No. 3, $2.50 each.....25%

Boxes, Mitre—

C. E. Jennings & Co.....30%
Langdon .....15&10%
Perfection .....℔ doz. $30.00
Schatz 40%

Braces—

Common Ball, American.$1.15@1.25
Barber's .....50&10&10@60&10%
Fray's Genuine Spofford's.....60%
Fray's No. 70 to 120, 81 to 123, 207 to 414 .....60%
C. E. Jennings & Co.....50&5%
Mayhew's Ratchet.....60%
Mayhew's Quick Action Hay Pat...50%
Millers Falls Drill Braces.....25&10%
P., S. & W. Co., Peck's Pat.60&10@65%

Brackets—

Wrought Steel.....80&10@..%
Bradley's Wire Shelf:
Full cases.....80&10&10%
Broken cases.....80&10%
Griffin's Pressed Steel.....80%
Griffin's Folding Brackets.....70&10%
Stowell's Cast Shelf.....75%
Stowell's Sink.....50%
Western, W. G. Co., Wire.....60&10%

Bright Wire Goods—See *Wire and Wire Goods.*

Broilers—

Western, W. G. Co.....80%
Wire Goods Co.....75@75&10%

Buckets, Galvanized—

Price per dozen.

Quart.....	*10*	*12*	*14*
Water, Regular...	*1.40*	*1.70*	*1.90*
Water, Heavy....	*3.40*	*3.70*	*3.80*
Fire, Rd. Bottom..	*2.30*	*2.55*	*2.95*
Well	*2.55*	*2.87*	*3.15*

Bucks, Saw—

Hoosier.....℔ gro. $36.00

Bull Rings—See *Rings, Bull*

Butts—Brass—

Wrought, list Sept., '96.....30%
Cast Brass, Tiebout's.....50%

Cast Iron—

Fast Joint, Broad....50@50&10%
Fast Joint, Narrow...50@50&10%
Loose Joint.....70&5@70&10%
Loose Pin.....70&5@70&10%
Mayer's Hinges.....70&5@70&10%
Parliament Butts....70&5@70&10%

Wrought Steel—

Table and Back Flaps...75%
Narrow and Broad.....75%
Inside Blind.....75&10%
Loose Pin.....75%
Loose Pin, Ball and Steeple Tip .....50&20%
Japanned Ball Tip Butts... 70&10%
Bronzed, Wrt., Nar. and Inside Blind Butts....55&10%

Ex. 10&10@10&10&10%

Cages, Bird—

Hendryx, Brass:
3000, 5000, 1100 series.....5%
1200 series.....33⅓%
200, 300, 600 and 900 series.....40&10%
Hendryx Bronze:
700, 800 series.....40&10%
Hendryx Enameled.....40&10%

Calipers—See *Compasses.*

Calks, Toe and Heel—

Blunt, 1 prong.....per lb.4¢4¼¢
Sharp, 1 prong...per lb., 4½@4¾¢
Gautier, Blunt.....4@4¼¢
Gautier Sharp.....4½@4¾¢
Perkins', Blunt Toe.....℔ lb 3.65¢
Perkins', Sharp Toe.....℔ lb 4.15¢

Can Openers—

See *Openers, Can.*

Cans, Milk—

	5	8	10 gal.
Illinois Pattern	$1.35	1.85	2.05 each.
New York Pattern	1.50	2.20	2.45 each.
Baltimore Pattern	1.50	2.20	2.45 each.
Dubuque	1.35	1.60	1.75 each.

Cans, Oil—

Buffalo Family Oil Cans:

3	5	10 gal.
$18.00	60.00	129.60 gro., net.

Caps, Percussion—

Eley's E. B.....52@55¢
G. D.....per M 34@35¢
F. L.....per M 40@42¢
G. E.....per M 48@50¢
Musket.....per M 62@63¢

Primers—

Berdan Primers, $2 per M.20&5%
B. L. Caps (Sturtevant Shells) $2 per M.....20%
All other primers per M.$1.52@1.60

Cartridges—

Blank Cartridges:
32 C. F., $5.50.....10&5%
38 C. F., $7.00.....10&5%
22 cal. Rim, $1.50.....10&5%
32 cal. Rim, $2.75.....10&5%
B. B. Caps, Con. Ball, Swgd.$1.90
B. B. Caps, Round Ball....$1.49
Central Fire.....25%
Target and Sporting Rifle..15&5%
Primed Shells and Bullets.15&10%
Rim Fire, Sporting.....50%
Rim Fire, Military.....15&5%

Casters—

Bed.....70@70&10%
Plate.....60&10@60&10&5%
Philadelphia.....75@75&10%
Acme, Ball Bearing.....33⅓%
Buss.....70&10%
Boss Anti-Friction.....70&10%
Gem (Roller Bearing).....80%
Martin's Patent (Phoenix).....45%
Standard Ball Bearing.....45%
Tucker's Patent low list.....30%
Yale (Double Wheel) low list.....50%

Cattle Leaders—

See *Leaders, Cattle.*

Chain, Coil—

American Coil, Straight Link:

3-16	¼	5-16	⅜	7-16	½ 9-16
7.40	5.10	4.15	3.45	3.30	3.20 3.15
⅝	¾	⅞	1 to 1¼ inch.		
3.10	3.00	2.95	2.95 per 100 lb.		

German Coil.....60&10&10@70%

Halters and Ties—

Halter Chains...60&10@60&10&10%
German Pattern Halter Chains, list July 24, '97.....60&10&10%
Cow Ties.....60@60&10%

Trace, Wagon, &c.—

Traces, Western Standard: 100 pr.
6½—6-3, Str'ght, with ring.$23.50
6½—6-2, Str'ght, with ring.$24.50
6½—8-2, Str'ght, with ring.$28.00
6½—10-2, Str'ght, with ring.$32.00
NOTE.—Add 2c per pair for Hooks. Twist Traces 2c per pair higher than Straight Link.
Trace, Wagon and Fancy Chains.....60&5@60&10&5%

Miscellaneous—

Jack Chain, list July 10, '93:
Iron.....60&10@60&10&5%
Brass.....60&10@60&10&10%
Safety Chain.....75@75&10&5%
Gal. Pump Chain.....lb. 5@5¼¢
Covert Mfg. Co.:
Breast.....40&2%
Halter.....40&2%
Heel.....40&2%
Rein.....40&2%
Stallion.....40&2%
Covert Sad. Works:
Breast.....70%
Halter.....70%
Hold Back.....70%
Rein.....70%
Oneida Community:
Am. Coil and Halters.....40@40&5%
Am. Cow Ties.....45@60%
Eureka Coil and Halter....45@50&5%
Niagara Coil and Halter....45@50&5%
Niagara Cow Ties....45&5@50&10&5%
Niagara Wire Dog Chains..45@60&5%
Wire Goods Co.:
Dog Chain.....70&10%
Universal Dbl.-Jointed Chain.....50%

Chalk—(From Jobbers.)

Carpenters' Blue.....gro. 35@38¢
Carpenters' Red.....gro. 30@33¢
Carpenters' White....gro. 25@28¢
See also Crayons.

Checks, Door—

Bardsley's.....45%
Columbia.....50&10%
Eclipse.....60&10%

Chests, Tool—

American Tool Chest Co.:
Boy's Chests, with Tools.....55%
Youths' Chests, with Tools.....40%
Gentlemen's Chests, with Tools..30%
Farmers', Carpenters', etc., Chests, with Tools.....20%
Machinists' and Pipe Fitters' Chests, Empty.....30%
Tool Cabinets.....50%
C. E. Jennings & Co.'s Machinists' Tool Chests.....33⅓&10%

Chisels—Socket Framing and Firmer

Standard List.....70&10@75&10%
Buck Bros.....30%
Charles Buck.....30%
C. E. Jennings & Co. Socket Firmer No. 10.....60%
C. E. Jennings & Co. Socket Framing No. 15.....60%
Ohio Tool Co.'s.....70%
Swan's.....70%
L. & I. J. White.....30@30&5%

Tanged—

Tanged Firmers....40&5@40&10%
Buck Bros.....30%
Charles Buck.....30%
C. E. Jennings & Co. Nos. 191, 181..25%
L. & I. J. White, Tanged.....25&5%

Cold—

	lb.
Cold Chisels, good quality	*13@15¢*
Cold Chisels, fair quality	*11@12¢*
Cold Chisels, ordinary	*9@10¢*

Chucks—

Beach Pat., each $8.00.....35&5%
Pratt's Positive Drive.....25%
Empire.....25%
Blacksmiths'.....25%
Skinner Patent Chucks:
Independent Lathe Chucks.....50%
Universal.....50%
Combination.....50%
Drill Chucks, New Model.....30%
Drill Chucks, Standard.....40%
Drill Chucks, Skinner Pat., 0, 1, 2.40%
Drill Chucks, Skinner Pat., 3, 4, 5, 6, 7, 8.....30%
Drill Chucks, Positive Drive.....30%
Planer Chucks.....25%
Face Plate Jaws.....40%
Standard Tool Co.:
Improved Drill Chuck.....45%
Union Mfg. Co.:
Combination.....50%
Czar Drill.....35%
Combination Geared Scroll.....40%
Geared Scroll.....40%
Independent.....50%
Independent Steel.....40%
Union Drill.....45%
Universal.....50%
Independent Iron F. Plate Jaws.40%
Independent Steel F. Plate Jaws.40%
Westcott Patent Chucks:
Lathe Chucks.....50%
Little Giant Auxiliary Drill.....50%
Little Giant Double Grip Drill..50%
Little Giant Drill, Improved.....50%
Oneida Drill.....50%
Scroll Combination Lathe.....50%

Clamps—

Adjustable, Hammers'.....20@20&5%
Cabinet, Sargent's.....50&10%
Carriage Makers', P. S. & W. Co..50%
Carriage Makers', Sargent's.....60%
Besly, Parallel.....33⅓&10%
Lineman's, Utica Drop Forge & Tool Co.....40%
Saw Clamps, see Vises, Saw Filers'.

Cleaners, Drain—

Iwan's Champion, Adjustable.....55%
Iwan's Champion, Stationary.....45%

Sidewalk—

Star Socket, All Steel..℔ doz. $4.05 net
Star Shank, All Steel..℔ doz. $3.24 net
W. & C. Shank, All Steel, ℔ doz., 7½ in., $3.00; 8 in., $3.25.

Cleavers, Butchers'—

Foster Bros.....30%
New Haven Edge Tool Co.'s.....45%
Fayette R. Plumb.....33⅓@33⅓&10%
L. & I. J. White.....30%

Clippers—

Chicago Flexible Shaft Company:
'98 Chicago Horse.....$8.75 } 15%
1902 Chicago Horse.....10.75 }
20th Century Horse, each, $5.00...20%
Lightning Belt.....$15.00 }
Chicago Belt.....$20.00 } 15%
Stewart's Patent Sheep, $12.75....20%

Finger Nail Clippers—

Smith & Hemenway Co.℔ doz. net $2.00

Clips, Axle—

Eagle, 5-16 and ⅜ in..75@75&10%
Norway, 5-16 and ⅜ in..60&10@70%

Cloth and Netting, Wire—See *Wire, &c.*

Cocks, Brass—

Hardware list:
Compression, Plain Bibbs, Globe, Kerosene, Racking, &c., Cocks.....70&10@75%

Coffee Mills—

See *Mills, Coffee.*

Collars, Dog—

Nickel Chain, Walter B. Stevens & Son's list.....40%
Leather, Walter B. Stevens & Son's list.....40%

Combs, Curry—

Metal Stamping Co.....40%

Mane and Tail—

Covert's Saddlery Works.....60&10%

Compasses, Dividers, &c.

Ordinary Goods.....75&5@75&10%
Bemis & Call Hdw. & Tool Co.:
Dividers.....65%
Calipers, Double.....65%
Calipers, Inside or Outside.....65%
Calipers, Wing.....60%
Compasses.....50%

Conductor Pipe, Galva.—

L. C. L. to Dealers:

Territory.	*Nested.*	*Not nested.*
A Eastern	*75&5%*	*75%*
B, Eastern	*75&10%*	*75&5%*
Central	*75&5%*	*70&10&5%*
Southern	*70&7½%*	*70&2½%*
S. Western	*70&5%*	*70%*

Terms, 60 days; 2% cash 10 days. Factory shipments generally delivered.
See also Eave Troughs.

Coolers, Water—

Gal. each	2	3	4	6	8
Labrador	$1.20	$1.50	$1.80	$2.10	$2.70
Gal.	3	4	5	6	8
Iceland, ea.	$1.80	$2.10	$2.40	$3.00	
Gal.	2	3	4	6	8
Galv. Lined, ea.	$1.85	$2.00	$2.25	$2.90	$3.90

25%

Gavl. Lined, side handles,

Gal.	2	3	4	6	8
Each.	$1.95	$2.15	$2.40	$3.30	$4.15..25%

Coopers' Tools—

See *Tools, Coopers'.*

Cord—Sash—

Braided, Drab.....lb. 35¢
Braided, White, Com..lb.22@23½¢
Cable Laid Italian..... lb., A, 18¢; B, 16¢
Common India.....lb. 10@10½¢
Cotton Sash Cord, Tw'ted..11@17¢
Patent Russia.....lb...@11¢
Cable Laid Russia....lb...@15¢
India Hemp, Braided..lb...@18¢
India Hemp, Twisted..lb. 12@13¢
Patent India, Twisted.lb. 12@13¢
Anniston Cordage Co.: Braided Cotton, Old Glory, Nos. 7 to 12....℔ lb 28 ¢
Anniston, Nos. 7 to 12....℔ lb 22 ¢
Old Colony, Nos. 7 to 12..℔ lb 22 ¢
Anniston Drab, Nos. 7 to 12..℔ lb 26 ¢
Pearl Braided, cotton, No. 6, ℔ lb. 23½¢; No. 7, 22½¢; Nos. 8 to 12, 22¢.
Eddystone Braided, Nos. 7, 8, 9 and 10.....℔ lb 24 ¢
Eddystone Braided Cotton, No. 6..℔ lb 25 ¢
Harmony Cable Laid Italian, Nos. 7 to 10.....℔ lb 23 ¢
Peerless:
Cable Laid Italian.....16 ¢
Cable Laid Russian.....14 ¢
Cable Laid India.....12 ¢
Braided India.....18 ¢
Samson, Nos. 8 to 12:
Braided, Drab Cotton.....℔ lb 40 ¢
Braided, Italian Hamp....℔ lb 40 ¢
Braided, Linen.....℔ lb 55 ¢
Braided, White Cotton or Spot....℔ lb 35 ¢
Massachusetts, White.....℔ lb 28 ¢
Massachusetts, Drab.....℔ lb 32 ¢
Phoenix, White, Nos. 8 to 12, 24¢; No. 7, 24½¢; No. 6, 25½¢.
Silver Lake:
A quality, Drab.....40 ¢
A quality, White.....35 ¢
B quality, Drab.....35 ¢
B quality, White.....30 ¢
Italian Hemp.....40 ¢
Linen.....57½¢

Wire, Picture—

List Oct., '00.....
85&10&10@85&10&10&5%
Hendryx Standard Wire Picture Cord, 85&10&5%

Cradles—

Grain.....40&12½%

Crayons—

White Round Crayons, gr. 5½@6¢
Cases, 100 gro., $4.00, at factory.
D. M. Steward Mfg. Co.:
Jumbo Crayons.....gr. $3.50
Metal Workers' Crayons..gr. $2.50
Soapstone Pencils, round, flat or square.....gr. $1.50
Rolling Mill Crayons.....gr. $2.50
Railroad Crayons (composition) gr. $2.00
Case lots, 20%
Zelnicker's Lumber:
Red, Blue, Green.....℔ gro. $6.50
Black.....℔ gro. $4.00
See also Chalk.

Crooks, Shepherds'—

Fort Madison, Heavy.....℔ doz. $7.00
Fort Madison, Light.....℔ doz. $6.50

Crow Bars—See *Bars, Crow.*

Cultivators—

Victor Garden.....50%

Cutlery, Table—

International Silver Company:
No. 12 M'd'm Knives, 1847..℔ doz. $3.50
Star, Eagle, Rogers & Hamilton and Anchor.....℔ doz. $3.00
Wm. Rogers & Son.....℔ doz. $2.50

Cutters—Glass—

H. H. Mayhew Co.....40%
Red Devil.....50%
Smith & Hemenway Co.....50%
Woodward.....40%

Meat and Food—

American.....30%

Nos.	1	2	3	4	B	5
Each	$5	$7	$10	$25	$50	$60

Enterprise.....25@25&7½%

Nos.	5	10	12	22	32
Each	$2	$3	$2.75	$4.50	$6

Dixon's.....℔ doz. 30&10@40%

Nos.	1	2	3	4
	$14.00	$17.00	$19.00	$30.00

Ideal.....40&10@50
Little Giant.....℔ doz. 33⅓@40%

Nos.	305	312	320	322
	$35.00	$48.00	$44.00	$72.00 $68.00

N. E. Food Choppers.....40%
New Triumph No. 605, ℔ doz. $24.00.. 30&10@40%
Russwin Food, No. 1, $24.00; No. 2, $27.00.....45&10&10%
Woodruff's.....℔ doz. 30&10@40%

Nos.	100	150
	$15.00	$18.00

Enterprise Beef Shavers.....25@30%

Slaw and Kraut—

Henry Disston & Sons:
Slaw, Corn Grater, &c.....40%
Kraut Cutters, 24 x 7, 26 x 8, 30 x 9.....55%
Kraut Cutters, 36 x 12, 40 x 12....40%
J. M. Mast Mfg. Co.:
Slaw Cutters, 1 Knife....℔ doz. $3.00
Combined Slaw Cutter and Corn Grater.....℔ doz. $4.00
Tucker & Dorsey Mfg. Co.:
Kraut Cutters.....40%
Slaw Cutters, 1 Knife..℔ gr. $18@$20
Slaw Cutters, 2 Knife..℔ gr. $22@$36

Tobacco—

All Iron, Cheap..doz. $4.25@$4.50
Enterprise.....25@30%
National, ℔ doz., No. 1, $21; No. 2, $18.....40%
Sargent's, ℔ doz., No. 2.....60%
Sargent's, Nos. 12 and 21.....60&10%

Washer—

Appleton's, ℔ doz., $16.00....50&10&10%

Diggers, Post Hole, &c.—

Dalbey Post Hole Auger..per doz., $9.00
Iwan's Imp'ved Post Hole Auger.40&5%
Iwan's Vaughan Pattern Post Hole Augers.....℔ doz. $6.25
Iwan's Perfection Post Hole Digger..℔ doz. $8.25
Iwan's Split Handle Post Hole Diggers.....℔ doz. $7.25
Kohler's Universal.....℔ doz. $15.00
Kohler's Little Giant.....℔ doz. $12.00
Kohler's Hercules.....℔ doz. $10.00
Kohler's Invincible.....℔ doz. $9.00
Kohler's Rival.....℔ doz. $8.00
Kohler's Pioneer.....℔ doz. $7.20
Never-Break Post Hole Diggers, ℔ doz., $24.00.....60%
Samson, ℔ doz. $34.00.....25%

Dividers—See *Compasses.*

Doors, Screen—

Phillips', style E, ⅞ in....℔ doz. $10.50
Phillips', style 077, ⅞ in....℔ doz. $8.00
Phillips', style x-y, ⅞ in....℔ doz. $11.00

Drawers, Money—

Tucker's Pat. Alarm Till No. 1, ℔ doz., $18; No. 2, $15; No. 3, $12; No. 4, $18.

Drawing Knives—

See *Knives, Drawing.*

Dressers, Emery Wheel—

Diamond Emery Wheel Dressers....35%
Diamond Wheel Dresser Cutters....35%

Drills and Drill Stocks—

Common Blacksmiths' Drill, each.....$1.50@$1.75
Breast, Millers Falls.....15&10%
Breast, P. S. & W.....40&5%
Goodell Automatic Drills..40&3@40&10%
Johnson's Automatic Drills, Nos. 2 and 3.....16⅔%
Johnson's Drill Points.....16⅔%
Millers Falls Automatic Drills.33⅓&10%
Ratchet, Curtis & Curtis.....25%
Ratchet, Parker's.....40%
Ratchet, Weston's.....33⅓%
Ratchet, Whitney's, P. S. & W..50%
Whitney's Hand Drill, No. 1, $10.00; Adjustable, No. 19, $12.00.....33⅓%

Twist Drills—

Bit Stock.....60&10@60&10&10%
Taper and Straight Shank.... 60&10@60&10&5%

Drivers, Screw—

Screw D'ver Bits, per doz..15@60¢
Balsey's Screw Holder and 1 river, ℔ doz., 2½-in., $6; 4-in., $7.50; 6-in., $9.....40%
Buck Bros.' Screw Driver Bits.....30%
Champion.....50%
Edson.....60%
Fray's Hol. H'dle Sets, No. 3, $12..50%
Gay's Double Action Ratchet.....35%
Goodell's Auto..50&10&10@50&10&10&5%
Hurwood.....40%
Mayhew's Black Handle.....40%
Mayhew's Monarch.....40&10%
Millers Falls, Nos. 20 and 21....25&10%
Millers Falls, Nos. 11, 12, 41, 42..15&10%
Never Turn.....60%
New England Specialty Co.....50%
Sargent & Co.'s:
Nos. 1 and 60.....50&10&10%
Nos. 50 and 55.....60&10%
Nos. 20 and 40.....70&10%
Smith & Hemenway Co.....40&5%
H. D. Smith & Co.'s Perfect H'dle.40%
Stanley R. & L. Co.'s:
No. 64, Varn. Handles..60@60&10&10%
No. 86.....70@70&10&10%
Swan's:
Nos. 65 to 68.....50%
No. 40.....40&10%
Nos. 25, 35 and 45.....20&10&10%

Eave Trough, Galvanized—

Territory.	*L. C. L.*
A, Eastern	*80&6½%*
B, Eastern	*80&12½%*
Central	*80&7½%*
Southern	*70&20&10%*
S. Western	*75&12½%*

Terms.—2% for cash. Factory shipments generally delivered
See also Conductor Pipe and Elbows.

Elbows and Shoes—

Factory shipments:
Plain Rd., and Cor., 2, 3 and 4 in.....75&10%
Plain Rd., and Cor., 5 and 6 in.....60%
Perfect Elbows (S., S. & Co.).....40%

Emery, Turkish—

	4 to 16	5 4 to 150	Flour
Kegs.....lb.	5 ¢	5½¢	3½¢
½ Kegs.....lb.	5¼¢	5¾¢	3¾¢
Kegs.....lb.	5 ¢	6 ¢	
10-lb. cans, 10 in case.....	6½¢	7 ¢	6 ¢
10-lb. cans, less than 10.....	10 ¢	10 ¢	8 ¢

NOTE.—In lots 1 to 3 tons a discount of 10% is given.

Extractors, Lemon Juice—See *Squeezers, Lemon.*

Fasteners, Blind—

Zimmerman's.....50&10%
Walling's.....45%

Cord and Weight—

Ives.....40%

Faucets—

Cork Lined.....50@50&10%
Metallic Key, Leather Lined..
60&10@60&10&5%
Red Cedar.....40@40&10%
Petroleum.....70&10@75%
B. & L. B. Co.:
Metal Key.....60&10%
Star.....60%
West Lock.....50&10%
John Sommer's Peerless Tin Key....40%
John Sommer's Boss Tin Key.....50%
John Sommer's Victor Mtl. Key.50&10%
John Sommer's Duplex Metal Key..60%
John Sommer's Diamond Lock.....40%
John Sommer's I.X.L. Cork Lined...50%
John Sommer's Reliable Cork Lined..
50&10%
John Sommer's Chicago Cork Lined.60%
John Sommer's O. K. Cork Lined...50%
John Sommer's No Brand, Cedar....50%
John Sommer's Perfection, Cedar....40%
McKenna, Brass:
Burglar Proof, N. P.....25%
Improved, ¾ and ⅞ inch.....25%
Self Measuring:
Enterprise, ℔ doz. $36.00.....40&10%
Lane's, ℔ doz. $36.00.....40&10%
National Measuring, ℔ doz. $36.40&10%

Felloe Plates—

See *Plates, Felloe.*

Files— Domestic—

List revised Nov. 1, 1899.
Best Brands.....70&10@75&5%
Standard Brands.75&10@75&10&10%
Lower Grade....75&10&10@80&10%

Imported—

Stubs' Tapers, Stubs' list, July 24, '97.....30%

Fixtures, Fire Door—

Richards Mfg. Co.:
Universal, No. 103.....$4.00
Special, No. 104.....$4.00
Fusible Links.....$0.25
Expansion Bolts.....50&10%

Grindstone—

Net Prices:

Inch	*15*	*17*	*19*	*21*	*24*
Per doz.	*$2.15*	*2.85*	*3.25*	*3.75*	*4.50*

P., S. & W. Co.....30&10@40%
Reading Hardware Co.....60%
Sargent's.....70%
Stowell's Giant Grindstone Hanger..
℔ doz. $6.00
Stowell's Grindstone Fixtures, Extra Heavy.....50&10&10%
Stowell's Grindstone Fixtures, Light..
60&10%

Fodder Squeezers—

See *Compressors.*

Forks—

Base Discounts Aug. 1, 1899, list:
Hay, 2 tine.....50&10&5%
Boys' & Fish, 2 tine..50&10&5%
Hay & Boys', 3 tine....60&5%
Hay & Boys', 4 tine....66⅔%
Champion Hay.....66⅔%
Hay & Header, long 3 tine.65%
Header, 4 tine.....65%
Barley 4 & 5 tine, Steel..60&20%
Manure, 4 tine.....60&15&2½%
Manure, 5 & 6 tine..66⅔&2½%
Spading.....70&2½%
Potato Digger, 6 tine....60&10%
Sugar Beet.....40&10%
Coke & Coal.....40&10%
Heavy Mill & Street.....65%
Iowa Dig-Ezy Potato.....60&10%
Victor, Hay.....60&15&2½%
Victor, Manure.....66⅔%
Victor, Header.....65%
Champion, Hay.....66⅔%
Champion, Header.....65%
Champion, Manure.....60&15&2½%
Columbia, Hay.....60&20%
Columbia, Manure.....70%
Columbia, Spading.....70&12½%
Hawkeye Wood Barley.....40%
W. & C. Potato Digger.....60&10%
Acme Hay.....60&20%
Acme Manure, 4 tine.....60&10&5%
Dakota Header.....60&20%
Jackson Steel Barley.....60&20%
Kansas Header.....65%
W. & C. Favorite Wood Barley.....40%
Plated.—See Spoons.

Frames— Saw—

White, S'g't Bar, per doz..75@80¢
Red, S'g't Bar, per doz...$1.00@1.25
Red, Dbl. Brace, per doz.$1.40@1.50

Freezers, Ice Cream—

Qt.	*1*	*2*	*3*	*4*	*6*
Each	*$1.25*	*$1.60*	*$1.90*	*$2.20*	*$2.80*

Fruit and Jelly Presses—

See *Presses, Fruit and Jelly.*

Fry Pans—See *Pans, Fry.*

Fuse— *Per 1000 Feet.*

Hemp.....$2.75
Cotton.....3.20
Waterproof Sgl. Taped..3.65
Waterproof Dbl. Taped..4.40
Waterproof Tpl. Taped..5.15
10&2½%

Gates, Molasses and Oil—

Stebbins' Pattern.80&10@80&10&5%

Gauges—

Marking, Mortise, &c.....
50&10&5@50&10&10&5%
Chapin-Stephens Co.:
Marking, Mortise, &c.50&10@50&10&10%
Scholl's Patent.....50&10@50&10&10%
Door Hangers.....50@50&10%
Stanley R. & L. Co.'s Butt and Rabbet Gauge.....20@20&10&10%
Wire, Brown & Sharpe's.....25%
Wire, Morse's.....25%
Wire, P., S. & W. Co.....30&10%

Gimlets— Single Cut—

Nail, Metal, Asst., gro..$1.40@1.50
Spike, Metal, Asst., gro.$2.80@3.50
Nail, Wood Handled, Assorted, gro. $1.75@2.00
Spike, Wood Handled, Assorted, gro. $4.25@4.50

Glass, American Window

See *Trade Report.*

Glasses, Level—

Chapin-Stephens Co.....60@60&10&10%

Glue, Liquid Fish—

Bottles or Cans, with Brush..
25@50%
Cans (½ pts., pts., qts., ½ gal., gal.).....25@48%
International Glue Co. (Martin's)...
40&10%

Grease, Axle—

Common Grade....*gro. $4.50@5.50*
Dixon's Everlasting..10-lb pails, ea. 85¢
Dixon's Everlasting in boxes, ℔ doz. 1 lb, $1.20; 2 lb, $2.00

Grips, Nipple—

Perfect Nipple Grips.....40&10&2%

Griddles, Soapstone—

Pike Mfg. Co.....33⅓@33⅓&10%

Grindstones—

Bicycle Emery Grinder.....$6.50
Bicycle Grindstones, each.....$2.50@3.00
Pike Mfg. Co.:
Improved Family Grindstones, per inch, ℔ doz.....$2.00 } 33⅓%
Pike Mower and Tool Grinder, each.....$6.00 }
Velox Ball Bearing, Mounted, Angle Iron Frames, each.....$3.25

Halters and Ties—

Covert Mfg. Co.:
Web.....45%
Jute Rope.....50&5%
Sisal Rope.....35&5%
Cotton Rope.....45&2%
Hemp Rope.....45&2%
Covert's Saddlery Works:
Web and Leather Halters.....70%
Jute and Manila Rope Halters..70%
Sisal Rope Halters.....60&20%
Jute, Manila and Cotton Rope Ties.70%
Sisal Rope Ties.....60&10%

Hammers—

Handled Hammers—

Heller's Machinists'...40&10@40&10&10%
Heller's Farriers.....40&10@40&10&10%
Magnetic Tack, Nos. 1, 2, 3, $1.25, $1.50, $1.75.....40@40&10&10%
Peck, Stow & Wilcox.....40&10&5%
Fayette R. Plumb:
Plumb, A. E. Nail.....
33⅓&7½@33⅓&10&7½%
Engineers' and B. S. Hand.....
50&7½&5@50&10&7½&5%
Machinists' Hammers.50&5@50&10&5%
Riveting and Tinners'.....
40&2½@40&10&2½%
Sargent's C. S. New List.....40%

Heavy Hammers and Sledges—

Under 3 lb., per lb. 50¢.....
80&10¢10@85%
3 to 5 lb., per lb. 40¢.....
80&10¢10@85%
Over 5 lb., per lb 30¢..85@85&10%
Wilkinson's Smiths'...lb. 9½@10¢

Handles—

Agricultural Tool Handles

Axe, Pick, &c.....60@60&10%
Hoe, Rake, &c.....45@50&5%
Fork, Shovel, Spade, &c.:
Long Handles.....45@50&5%
D Handles.....40%

Cross-Cut Saw Handles—

Atkins'.....40&5%
Champion.....45@45&10%
Disston's.....50%

Mechanics' Tool Handles—

Auger, assorted...*gro. $2.50@2.85*
Brad Awl.....*gro. $1.65@1.85*
Chisel Handles:
Apple Tanged Firmer, gro. assorted.....*$2.40@2.65*
Hickory Tanged Firmer, gro. assorted.....*$2.15@2.40*
Apple Socket Firmer, gro. assorted.....*$1.75@1.95*
Hickory Socket Firmer, gro. assorted.....*$1.45@1.60*
Hickory Socket Framing, gro. assorted.....*$1.60@1.75*
File, assorted.....gro. *$1.30@1.40*
Hammer, Hatchet, Axe, &c.
60&10@60&10&10%
Hand Saw, Varnished, doz. 80@85¢; Not Varnished...65@75¢
Plane Handles:
Jack, doz. 30¢; Jack, Bolted.75¢
Fore, doz. 45¢; Fore, Bolted.90¢
Chapin-Stephens Co.:
Carving Tool.....40@40&10%
Chisel.....65@65&10%
File and Awl.....65@65&10%
Saw and Plane.....40@40&10%
Screw Driver.....40@40&10%
Millers Falls Adj. and Ratchet Auger Handles.....15&10%
Nicholson Simplicity File Handle....
℔ gro. $0.85@$1.50

Hangers—

NOTE—Barn Door Hangers are generally quoted per pair, without track, and Parlor Door Hangers per double set with track, &c
Barn Door, New Pattern, Round Groove, Regular:

Inch	*3*	*4*	*5*	*6*	*8*
Single Doz.	*$0.90*	*1.25*	*1.60*	*1.95*	*2.50*

Barn Door, New England Pattern, Check Back, Regular:

Inch	*3*	*4*	*5*	*6*
Single Doz.	*$1.30*	*1.85*	*2.50*	*3.00*

Allith Mfg. Co.:
Reliable, No. 1.....per doz. $8.00
Reliable, No. 2.....per doz. $9.60
Chicago Spring Butt Co.:
Friction.....25%
Oscillating.....25%
Big Twin.....25%
Chisholm & Moore Mfg. Co.:
Baggage Car Door.....50%
Elevator.....30%
Railroad.....50%
Cronk & Carrier Mfg. Co.:
Loose Axle.....60&10&5%
Roller Bearing.....70&5%
Griffin Mfg. Co.:
Solid Axle, No. 10, $12.00.....70%
Roller Bearing, No. 11, $15.00.70%
Roller Bearing, Ex. Hy., No. 22, $18.00.....70%
Hinged Hangers, $16.00....60&10%
Lane Bros. Co.:
Parlor, Ball Bearing.....$4.00
Parlor, Standard.....$3.15
Parlor, No. 105.....$2.85
Parlor, New Model.....$2.80
Parlor, New Champion.....$2.25
Barn Door, Standard.60&10&2½%
Hinged.....net $6.40
Covered.....60&10%
Special.....70&5%
Lawrence Bros.:
Advance.....60&10%
Cleveland.....70&5
Clipper, No. 75.....60
Crown.....60&10%
Easy Parlor Door, Dbl. Sets, $2.50; Single Sets, $1.25.
Giant.....60&5%
Hummer.....70&5%
New York.....60&10
Peerless.....70&5%
Sterling.....60&10%
McKinney Mfg. Co.:
No. 1, Special, $15.....60&10%
No. 2, Standard, $18.....60&10%
Hinged Hangers, $16.....50
Meyers' Stayon Hangers.....60%
Richards Mfg. Co.:
Pioneer Wood Track No. 3..$2.15
Ball B'r'g St'l Track No. 10.$2.40
Roller B'r'g St'l Track No. 12.$2.30
Ball B'r'g St'l Track No. 13.$2.40
Roller B'r'g St'l Track No. 14.$2.30
Hero, Adj. Track No. 19.....50%
Adjustable Track Tandem Trolley Track No. 16.....50%
Seal, Steel Track No. 8.....$2.40
Auto Adj. Track No. 22..40&10%
Trolley F. D. No. 17.....$1.40
Trolley F. D. No. 129.....$2.35
Trolley F. D. No. 121.....$2.45
Trolley F. D. No. 150.....$2.60
Safety Underwriters F. D. No. 101.....$2.25
Tandem No. 44.....70&5%
Trolley F. D. No. 151.....$3.00
Palace, Adjustable Track No. 132.....40&10%
Royal, Adjustable Track No. 122.....40&10%
Ivel Wood Track No. 1.....$2.15
Trolley B. D. No. 20.....$1.35
Trolley B. D. No. 24.....$1.45
Trolley B. D. No. 27.....$1.50
Trolley B. D. No. 28.....$1.66
Roller Bearings Nos. 39, 40, 41, 43, 44.....70&5%
Anti-friction No. 42.....60&10
Hinged Tandem No. 48.....60
Folding Door B. B. Swivel No. 135.....30%
Safety Door Ranger Co.:
Storm King Safety.....60%
U. S. Standard Hinge.....60%
Stowell Mfg. & Foundry Co.:
Acme Parlor Ball Bearing....40%
Ajax Hinge Door.....60%
Apex Parlor Door.....50&10&5
Atlas.....60%
Baggage Car Door.....50%
Climax Anti-Friction.....50&10
Elevator.....40
Express.....50
Freight Car Door.....60
Interstate.....60&10%
Lundy Parlor Door.....50&10%
Magic.....60
Matchless.....60&10
Nansen.....70&5%
Parlor Door.....50&10%
Railroad.....50&10
Rex Hinge Door.....60
Street Car Door.....50
Steel, Nos. 300, 404, 500...50&10
Underwriters' Fire Door.....40
Wild West Warehouse Door.50
Zenith for Wood Track....50&10
A. L. Sweet Iron Works:
Check Back.....70%
Climax Anti-Friction.....50&10%
Eagle.....70
Hylo Hinge.....60
New Perfection.....60
Pilot.....60
Pilot Hinge.....60%
Rider Wooster.....65
Western Pattern.....70%
Taylor & Boggis F'y Co.'s Kidder's Roller Bearing.50&15&10&5%
Wilcox Mfg. Co.:
Bike Roller Bearing.....60&10%
C. J. Roller Bearing.....60&10%
Cycle Ball Bearing.....50%
Dwarf Ball Bearing.....40
Ives, Wood Track.....60&10%
L. T. Roller Bearing...60&10&5%
New Era Roller Bearing..50&10%
O. K. Roller Bearing..60&10&5%
Prindle, Wood Track.....60
Richards' Wood Track.....60
Richards' Steel Track.....50&10%
Spencer Roller Bearing....60&10%
Tandem, Nos. 1 and 2.....60%
Underwriters' Roller Bearing..40%
Velvet.....50
Wilcox Auditorium Ball B'r'g.20
Wilcox Barn Trolley No. 123..40%
Wilcox Elv. Door, Nos. 112 and 122½.....50%
Wilcox Elv. Door, No. 132...40%
Wilcox Fire Trolley, Roller Bearing.....30%
Wilcox Le Roy Noiseless Ball Bearing.....40%
Wilcox New Century..50&10&10%
Wilcox O. K. Steel Track....50%
Wilcox O. K. Trolley.....50%
Wilcox Trolley Ball Bearing..40%
Wilcox Wideman Narrow Gauge Ball Bearing.....40%
For Track, see Rail.

Extra 5@10% often given.

Hangers— Garment—

Pullman Trouser, No. 1....℔ gro. $9.00
Pullman Trouser, No. 4....℔ gro. $24.00
Victor Folding.....℔ gro. $9.60
Western, W. G. Co.....70&10%

Gate—

Myers' Patent Gate Hangers, ℔ doz. net.....$4.50

Hasps—

McKinney's Perfect Hasp, ℔ doz..50%

Hatchets—

Regular list, first quality..40@..%
Second quality $1.00 per doz. less than first quality.

Heaters, Carriage—

Clark, No. 5, $1.75; No. 5B, $2.00; No. 3, $2.25; No. 31), $2.75; No. 71), $3.00; No. 3E, $3.25; No. 1, $3.50.....15%
Clark Coal, ℔ doz. $0.75.....10%

Hinges—

Blind and Shutter Hinges—

Surface Gravity Locking Blind: (Victor; National; 1868 O. P.; Niagara; Clark's O. P.; Clark's Tip; Buffalo.)

No.	*1*	*3*	*5*
Doz. pair	*$0.75*	*1.35*	*2.70*

Mortise Shutter: (L. & P., O. S., Dixie, &c.)

No.	*1*	*1½*	*2*	*2½*
Doz. pair	*$0.70*	*.65*	*.60*	*.55*

Mortise Reversible Shutter (Buffalo, &c.):

No.	*1*	*1½*	*2*
Doz. pair	*$0.70*	*.65*	*.60*

North's Automatic Blind Fixtures, No. 2, for Wood, $9.00; No. 3, for Brick, $11.50.....10%
Parker.....70&75%
Reading's Gravity.....60
Sargent's, Nos. 1, 3, 5, 11 and 13..75%
Stanley's Steel Gravity Blind Hinges, ℔ doz. sets, without screws, $0.90; with screws, $1.20.
Wrightsville Hardware Co.:
O. S., Lull & Porter.....75&10&5%
Acme, Lull & Porter.....75&10%
Queen City Reversible.....75&10%
Shepard's Noiseless, Nos. 60, 65, 55.....75&10%
Niagara, Gravity Locking, Nos. 1, 3 & 5.....75&10&5%
1868, Old Pat'n, Nos. 1, 3 & 5.....
75&10&5%
Tip Pat'n, Nos. 1, 3 & 5..75&10&5%
Buffalo Gravity Locking, Nos. 1, 3 & 5.....75&10&5%
Shepard's Double Locking, Nos. 20 & 25.....70%
Champion Gravity Locking, No. 75.75%
Steamboat Gravity Locking, No. 10.75%
Pioneer, Nos. 060, 45 & 5½.....75%
Empire, Nos. 101 & 103.....70%
W. H. Co.'s Mortise Gravity Locking, No. 2.....60%

Gate Hinges—

Clark's or Shepard's—Doz. sets:

No.	*1*	*2*	*3*
Hinges with L'ves.	*$2.00*	*2.70*	*5.00*
Hinges only	*1.40*	*2.05*	*3.80*
Latches only	*.70*	*.70*	*.35*

New England:
With Latch.....*doz.* ...@$2.00
Without Latch...*doz.* ...@$1.60
Reversible Self-Closing:
With Latch.....*doz.* ...@$1.75
Without Latch...*doz.* ...@$1.35
Western:
With Latch.....*doz. $1.75*
Without Latch.....*doz. $1.15*
Wrightsville Hardware Co.:
Shepard's or Clark's, doz. sets,

Nos.	1	2	3
Hinges with Latches.	$2.00	2.70	5.00
Hinges only	1.40	2.05	3.80
Latches only	.70	.70	1.35

Pivot Hinges—

Bommer Bros. Pivot.....40%
Lawson Mfg. Co. Matchless.....45%

Spring Hinges—

Holdback Cast Iron.....
gro. $9.00@$9.50
Non-Holdback, Cast Iron.....
gro. $8.00@$8.50
J. Bardsley:
Bardsley's Non-Checking Mortise Floor Hinges.....45%
Bardsley's Patent Checking..15%
Bommer Bros.:
Bommer Ball Bearing Floor Hinges.....40%
Bommer Spring Hinges.....40%
Chicago Spring Butt Co.:
Chicago Spring Hinges.....25%
Triple End Spring Hinges....30%
Chicago (Ball Bearing) Floor Hinge.....50%
Garden City Engine House....25%
Keene's Saloon Door.....25%
Columbian Hardware Co.:
Acme, Wrought Steel.....30%
Acme, Brass.....25%
American.....30%
Columbia, No. 14.....℔ gr. $9.00
Columbia, No. 18.....℔ gr. $25.00
Columbia, Adjustable, No. 7.
℔ gr. $12.00
Gem, new list.....30%
Clover Leaf.....℔ gr. $12.50
Oxford, new list.....30%
Lawson Mfg. Co., Matchless....30%
Richards Mfg. Co.:
Superior Double Acting Floor Hinges.....40%
Shelby Spring Hinge Co.:
Buckeye All Steel Holdback Screen Door.....$9.00
Chief Ball B'r'g Floor Hinge.50%
Ohio Detachable Screen Door Hinge.....℔ gr. $12.00
The Stover Mfg. Co.:
Ideal, No. 16, Detachable.
℔ gr. $12.50
Ideal, No. 4.....℔ gr. $9.00
New Idea No. 1.....℔ gr. $9.00
New Idea, Double Acting....45%
New Idea Floor.....45%
Van Wagoner:
Ball Bearing.....25%
No. 777 Sh't Steel Holdb'k.℔ gro. nr.$9

Extra 10% often given on most of these Hinges.

Wrought Iron Hinges—

Strap and T Hinges, &c., list March 15, 1901:

Extra 3 or 4 tens

Light Strap Hinges..80&5%
H'vy Strap H'g's.80&20&10%
Light T Hinges...75&10&5%
Heavy T Hinges....75&5%
Extra H'vy T H'g's.80&20%
Hinge Hasps.....70%
Cor. Heavy Strap.80&20&10%
Cor. Ex. Heavy T...80&20%

Screw Hook and Strap.
6 to 12 in..lb. 3¼¢
1¼ to 20 in..lb. 3 ¢
22 to 36 in..lb. 2¾¢

Screw Hook and Eye:
¾ to 1 inch.....lb. 6 ¢
⅝-inch.....lb. 7 ¢
½-inch.....lb. 9 ¢

Hitchers, Stall—

Covert Mfg. Co., Stall Hitchers....35%

Hods— Coal—

	Per doz.			
Inch	*15*	*16*	*17*	*18*
Galv. Open	*$1.50*	*2.75*	*3.00*	*3.25*
Jap. Open	*1.90*	*2.10*	*2.25*	*2.55*
Galv. Funnel	*$3.00*	*3.30*	*3.60*	*3.90*
Jap. Funnel	*$2.45*	*2.65*	*2.85*	*3.30*

Masons, Etc.—

Cleveland Wire Spring Co.:
Steel Mortar.....each $1.45
Steel Brick.....each $1.10

Hoes— Eye—

Scovil and Oval Pattern.....60&10@60&10&10%
Grub, list Feb. 23, 1899.....70&10@75&10%
D. & H. Scovil.....35%

Handled—

August 1, 1899, list.
Field and Garden.....70&10%
Smith's Patent.....50%
Meadow & Rhode Island..75%
Black Diamond.....70&10%
Mortar and Street...70&10&10%
Planters'.....75&12½%
Cotton.....70&10&10%
Cotton Chopper.....75&12½%
Weeding Hoes.....66⅔&15%
Steel Weeders.....66⅔&15%
Malleable Weeders....66⅔&15%
Ft. Madison Cotton Hoe....70&10&10%
Ft. Madison Crescent Cultivator Hoe, ℔ doz.....70&10%
Ft. Madison Mattock Hoes:
Regular Weight.....℔ doz. 66⅔%
Junior Size.....℔ doz. $4.00
Ft. Madison Sprouting Hoe..℔ doz. 50%
Ft. Madison Dixie Tobacco Hoe.....75&10&7½%
Kretsinger's Cut Easy.....70&10%
Warren Hoe.....45&10%
W. & C. Ivanhoe.....75&2%
B. B. 6 in., Cultivator Hoe.....$3.15
B. B., 6¼ in.....$3.35
Acme Wedding.....℔ doz., net, $4.35
W. & C. L'tning Shuffle Hoe, ℔doz.$4.85

Hoisting Apparatus—

See *Machines, Hoisting.*

Holders— Bit—

Angular, ℔ doz. $24.00.....45&10%

Door—

Empire.....50%
Bardsley's.....45%

File and Tool—

Nicholson File Holders and File Handles.....33⅓&40%

Hooks—Cast Iron—

Bird Cage, Reading.....60%
Bird Cage, Sargent's List.....60&10%
Ceiling, Sargent's List.....50&10&10%
Clothes Line, Reading List.....60&10%
Clothes Line, Sargent's List.50&20&10%
Coat and Hat, Sargent's List...50&10%
Clothes Line, Stowell's.....70%
Coat and Hat, Reading.....45&20%
Coat and Hat, Stowell's.....70%
Coat and Hat, Wrightsville.....65%
Harness, Reading List.....66⅔%
Harness, Stowell's.....60%
School House, Stowell's.....70%

Wire—

Belt.....80&10@..%
Wire C. & H. Hooks:.....75&10@75&10&5%
Atlas, Coat and Hat:
Single Cases.....75%
10 Case Lots.....75&10%
Columbian Hdw. Co., Gem.....60&10%
Parker Wire Goods Co., King..75&10%
Van Wagoner, Coat and Hat.....70%
Western W. G. Co. Molding.....75%
Wire Goods Co.:
Acme.....60&10%
Chief.....70%
Crown.....70&10%
Czar.....65%
V Brace.....70&10%
Czar Harness.....50&10%

Wrought Iron—

Box, 6 in., per doz., $1.00; 8 in., $1.25; 10 in., $2.50.
Cotton.....doz. $1.05@$1.25
Wrought Staples, Hooks, &c.—
See Wrought Goods.

Miscellaneous—

Hooks, Bench, see Stops, Bench.
Bush, Light, doz. $4.75; Medium, $5.35; Heavy, $6.25

Grass....Nos.	*1*	*2*	*3*	*4*
Best	*$1.50*	*1.75*	*2.00*	
Common	*$1.30*	*1.50*	*1.60*	

Potato and Manure.....60&15%
Whiffletree.....lb. 5¾@6¢
Hooks and Eyes:
Brass.....60&10&10@70%
Malleable Iron.....70&10@75%
Covert Mfg. Co. Gate and Scuttle Hooks.....35%
Covert Saddlery Works' Self Locking Gate and Door Hook.....60%
Ft. Madison Cut-Easy Corn Hooks, ℔ doz. $3.25 net
Bench Hooks—See Bench Stops.
Corn Hooks—See Knives, Corn.

Horse Nails—

See *Nails, Horse.*

Horseshoes—

See *Shoes, Horse.*

Hose, Rubber—

Garden Hose, ¾-inch:
Competition.....ft. 4½@ 5 ¢
3-ply Standard.....ft. 6½@ 7 ¢
4-ply Standard.....ft. 7½@ 8 ¢
3-ply extra.....ft. 8½@ 9 ¢
4-ply extra.....ft. 10 @10½¢
Cotton Garden, ¾-in., coupled:
Low Grade.....ft. 6 @ 7 ¢
Fair Quality.....ft. 8 @ 9 ¢

Irons— Sad—

From 4 to 10.....lb. 2¾@3 ¢
B. B. Sad Irons.....lb. 3¼@3½¢
Chinese Laundry.....lb. 4¾@5 ¢
Chinese Sad.....lb. 4 @4¼¢
Mrs. Potts', cents per set:

Nos.	*50*	*55*	*60*	*65*
Jap'd Tops	*62*	*59*	*72*	*69*
Tin'd Tops	*65*	*62*	*75*	*72*

New England Pressing.lb. 3¾@4¢

Pinking—

Pinking Irons.....doz. 50@60¢

Soldering—

Soldering Coppers, 2½ & 3..20@21¢
1½ & 2.....22@23¢

Jacks, Wagon—

Covert Mfg. Co.:
Auto Screw.....30&5%
Steel.....45&2%
Covert's Saddlery Works:
Daisy.....60&10%
Victor.....60%
Lockport.....50%
Lane's Steel.....30&10&5%
Richards' Tiger Steel, No. 130.....40%

Kettles—

Brass, Spun, Plain.....20@25%
Enameled and Cast Iron—See Ware, Hollow.

Knives—

Butcher, Kitchen, &c.—

Foster Bros.' Butcher, &c.....30%
Smith & Hemenway Co.....40&10%
Wilkinson Shear & Cutlery Co.....50%

Corn—

Withington Acme, ℔ doz., $2.65; Dent, $2.75; Adj. Serrated, $2.20; Serrated, $2.10; Yankee No. 1, $1.50; Yankee No. 2, $1.15.

Drawing—

Standard List.....70&10@75&10%
C. E. Jennings & Co., Nos. 45, 46..60%
Jennings & Griffin, Nos. 41, 42.....60%
Ohio Tool Co.'s.....70%
Swan's.....70&10&2½%
Watrous.....16⅔%
L. & I. J. White.....20&5@25%

Hay and Straw—

Serrated Edge.....per doz. $5.50
Iwan's Sickle Edge.....℔ doz. $9.50
Iwan's Serrated.....℔ doz. $10.00

Mincing—

Buffalo.....℔ gro. $13.00

Miscellaneous—

Farriers'.....doz. $3.00@3.25
Wostenholm's.....℔ doz. $3.00@3.25

Knobs—

Base, 2½-inch, Birch, or Maple, Rubber tip.....gro.$1.15@1.20
Carriage, Jap., all sizes.....gro. 40@45¢
Door, Mineral.....doz. 65@70¢
Door, Por. Jap'd.....doz. 70@75¢
Door, Por. Nickel..doz. $2.05@2.15
Bardsley's Wood Door, Shutters, &c.15%
Picture, Sargent's.....60&10&10%

Lacing, Leather—

See *Belting, Leather—*

Ladders, Store, &c.—

Lane's Store.....25%
Myers' Noiseless Store Ladders....50%
Richards Mfg. Co.:
Improved Noiseless, No. 112.....40%
Climax Shelf, No. 113.....40%
Trolley, No. 109.....40%

Ladles, Melting—

L. & G. Mfg. Co. (low list).....25%
P. S. & W.....50%
Reading.....60%
Sargent's.....50&10%

Lanterns—Tubular—

Regular Tubular, No. 0.....doz. $4.35@4.75
Lift Tubular, No. 0..doz. $4.75@5.25
Hinge Tubular, No. 0.....doz. $4.75@5.25
Other Styles.....40&10@40&10&5%

Bull's Eye Police—

No. 1, 2¾-inch.....$2.50@2.75
No. 2, 3-inch.....$2.75@3.00

Lasts and Stands, Shoe—

Stowell's Atlas, Malleable Iron.....50%
Stowell's Badger, Cast Iron.....50%

Latches— Thumb—

Roggin's Latches, with screw..doz. 35@40¢

Door—

Richards' Bull Dog, Heavy, No. 125.40%
Richards' Trump, No. 127.....50%

Leaders, Cattle—

Small.....doz. 50¢; large, 60¢
Covert Mfg. Co.....35%

Lifters, Transom—

R. & E.....33⅓%

Lines—

	Wire Clothes, Nos.	*18*	*19*	*20*
100 feet		*$2.20*	*2.00*	*1.65*
75 feet		*$1.80*	*1.70*	*1.30*

Samson Cordage Works:
Solid Braided Chalk, Nos. 0 to 3..40%
Silver Lake Braided Chalk, No. 0, $6.00; No. 1, $6.50; No. 2, $7.00; No. 3, $7.50.....℔ gr. 20%
Masons' Lines, Shade Cord, &c.:
White Cotton, No. 3½, $1.50; No. 4, $2.00; No. 4½, $2.50; Colors, No. 3½, $1.75; No. 4, $2.25; No. 4½, $2.75; Linen, No. 3½, $2.50; No. 4, $3.50; No. 4½, $4.50.....20%
Tent and Awning Lines: No. 5, White Cotton, $7.50; Drab Cotton, $8.50.....20%
Clothes Lines, White Cotton: 50 ft., $2.75; 60 ft., $3.25; 70 ft., $3.75; 75 ft., $4.00; 80 ft., $4.25; 90 ft., $4.75; 100 ft., $5.25.....20%
Anniston Waterproof Clothes, 50 ft., ℔ gro., $24.00; Gilt Edge, $22.00; Air Line, $22.00; Acme, $17.00; Alabama, $15.00; Empire, $14.00; Advance, $13.50; Oriole, $20.00; Albemarle, $13.50; Eclipse, $12.50; Chicago, $11.00; Standard, $10.00; Columbia, $8.50; Allston, $12.50; Calhoun, $11.00.

Locks— Cabinet—

Cabinet Locks...33⅓@33⅓&7½%

Door Locks, Latches, &c.—

NOTE.—Net Prices are very often made on these goods.
Reading Hardware Co.....45&20%
R. & E. Mfg. Co.....40%
Sargent & Co.....40&10%
Stowell's Steel Door Latches.....50%

Elevator—

Stowell's.....50%

Padlocks—

Wrought Iron....75&10&5@80&5%
R. & E. Mfg. Co. Wrought Steel and Brass.....75@75&10%

Sash, &c.—

Ives' Patent:
Bronze and Brass.....62½%
Crescent.....50&10%
Iron.....62½%
Window Ventilating.....60%
Robison Patent Ventilating Sash Lock.....40%
Wrought Bronze and Brass.....55%
Wrought Steel.....55%
Pullman Patent Ventilating Lock..25%
Reading.....60%

Machines—Boring—

Com. Upr't, without Augers.$2.00
Com. Ang'l'r, without Augers.$2.25
Without Augers.
R. & E. Mfg. Co.: Upright, Angular.
Improved No. 3..$4.25 No. 1..$5.00
Improved No. 4.. 3.75 No. 2.. 3.38
Improved No. 5.. 2.75
Jennings', Nos. 1 and 4.....35&5%
Millers' Falls.....5.75
Snell's, Rice's Pat. 2.50 2.75

Corking—

Reisinger Invincible Hand Power....℔ doz. $48.00

Fence—

Williams' Fence Machines....each, $5.50

Hoisting—

Moore's Anti-Friction Differential Pulley Block.....30%
Moore's Hand Hoist, with Lock Brake.....20%

Ice Cutting—

Chandler's.....12½%

Washing—

Boss Washing Machine Co.: Per doz.
Champion Rotary Banner No. 1..$54.00
Standard Champion No. 1.....$48.00
Standard Perfection.....$36.00
Cinti Square Western.....$30.00
Uneeda American, Round.....$29.00

Mallets—

Hickory.....45&5@50%
Lignumvitæ.....45&5@50%
Tinners' Hickory and Apple-wood.....doz. 45&5@50%

Mangers, Stable—

Swett Iron Works.....50%

Mashers, Vegetable—

Western, W. G. Co., Potato....60&10%

Mats, Door—

Elastic Steel (W. G. Co.).....10%

Mattocks—

See *Picks and Mattocks.*

Milk Cans—See *Cans, Milk.*

Mills, Coffee, &c.—

Enterprise Mfg. Co.....25@30%
National list Jan. 1, 1902.....30%
Parker's Columbia & Victoria.50&10@60%
Parker's Box and Side.....50&10@60%
Swift, Lane Bros. Co.....30%

Mowers, Lawn—

NOTE.—Net prices are generally quoted

	10	*12*	*14*	*16-*in.
Cheap.....all sizes,	*$1.75@2.00*			
Good.....all sizes,	*$2.25@2.50*			
High Grade	*4.25*	*4.50*	*4.75*	*5.00*

Continental.....60&5%
Great American.....70%
Great American Ball B'r'g, new list.70%
Quaker City.....70%
Pennsylvania.....60&5%
Pennsylvania, Jr. Ball Bearing....60%
Pennsylvania Golf.....50%
Pennsylvania Horse.....33⅓&5%
Pennsylvania Pony.....40&5%
Philadelphia:
Styles M. S. C., K., T.....70&5%
Style A, all Steel.....60&5%
Style E, High Wheel.....70&10&5%
Drexel and Gold Coin, special list.50%

Nails—

Wire Nails and Brads, Papered, List July 20, 1899..85&10&10@90%
Cut and Wire. See *Trade Report.*
Hungarian, Finishing, Upholsterers' &c. See *Tacks.*

Horse—

Nos.	*6*	*7*	*8*	*9*	*10*	
Anchor	23	21	20	19	18	...40&5%
Champlain	28	26	25	24	23	.....50%
Coleman	13	12	12	11	11	.....net
New Haven..	23	21	20	19	18	...40&5%
Putnam	23	21	20	19	18	....33⅓%
New Putnam.	19	18	17	16	16	...10&10%
Western						℔ lb 8½¢

Jobbers' Special Brands.....per lb. 8½@10¢

Picture—

	1½	*2*	*2½*	*3*	*3½ in.*
Brass H'd.	*.55*	*.55*	*.60*	*.70*	*.. gro*
Por. Head.	*..*	*1.10*	*1.10*	*1.10*	*.. gro*

Nippers—

See *Pliers and Nippers.*

Nuts—

Cold Punched: Off list.
Mfrs. or U. S. Standard.
Square, plain.....$5.10
Hexagon, plain.....$5.60
Square, C. T. & R.....$5.30
Hexagon, C. T. & R.....$6.00
Hot Pressed:
Mfrs., U. S. or Nar. Gauge Stan'd.
Square, Blank.....$5.80@5.90
Hexagon, Blank.....$6.30@6.40
Square, Tapped.....$5.80@5.90
Hexagon, Tapped.....$6.30@6.40

Oakum—

Best or Government.....lb. 6½¢
Navy.....lb. 5 ¢
U. S. Navy.....lb. 6 ¢
Plumbers' Spun Oakum.....2½¢
In carload lots ¼¢ lb. off, f.o.b. New York.

Oil Tanks—See *Tanks, Oil.*

Oilers—

Brass and Copper.....50&10%
Tin or Steel.....65&10%
Zinc.....65&10%
Chase or Paragon:
Brass and Copper...45&10@50%
Tin or Steel.....65&10%
Zinc.....65&10%
Malleable, Hammers' Imp'ed, No. 1, $3.60; No. 2, $4; No. 3, $4.40. ℔ doz. 20%
Malleable, Hammers' Old Pattern, same list.....50&10%
American Tube & Stamping Co.:
Spring Bottom Cans.....70@70&10%
Railroad Oilers, &c.....60@60&10%

Openers— Can—

French.....doz. 35¢
Iron Handle.....Per doz. 25@27¢
Sprague, Iron Handle Per doz. 35@40¢
Sardine Scissors...doz. $1.75@$3.00
National.....50%
Stowell's Sprague.....℔ doz. 35@45¢

Egg—

Nickel Plate.....℔ doz., $2.00
Silver Plate.....℔ doz., $4.00

Packing—

Asbestos Packing, Wick and Rope.....lb. 14@16¢

Rubber—

(Fair quality goods.)
Sheet, C. I.....80@10¢
Sheet, C. O. S.....90@13¢
Sheet, C. B. S.....10@14¢
Sheet, Pure Gum.....50@65¢
Sheet, Red.....40@50¢
Jenkins' '96, ℔ lb 80¢.....25@25&5%

Miscellaneous—

American Packing...lb. 7@10 ¢
Cotton Packing.....lb. 16@25 ¢
Italian Packing.....lb. 9@12½¢
Jute.....lb. 4@ 4½¢
Russia Packing.....lb. 8@11 ¢

Pails, Creamery—

S. S. & Co., with gauges—No. 1, $6.25; No. 2, $6.50 ℔ doz.

Pails, Water, Well, &c.—

See *Buckets.*

Pans— Dripping—

Standard List....60&10@60&10&5%

Fry—

Common Lipped:

Nos.	*1*	*2*	*3*	*4*	*5*
Per doz.	*$0.75*	*0.80*	*0.90*	*1.10*	*1.30*

Refrigerator, Galva.—

Inch	*12*	*14*	*16*	*18*
Per doz.	*$1.95*	*2.25*	*2.80*	*3.15*

Roasting and Baking—

Regal, S., S. & Co. ℔ doz., Nos. 5, $4.50; 10, $5.25; 20, $5.75; 30, $6.25.
Savory, ℔ doz., net, Nos. 200, $9.00; 400, $15.00.
Simplex, ℔ gro.:

No.	40	50	60	140	150	160
	$30.00	35.00	42.00	34.00	39.00	46.00

Paper—Building Paper

Asbestos: lb.
Building Felt.....2¼¢
Mill Board, sheet, 40x40 in..3½¢
Mill Board, roll, thicker than 1-16 inch.....3½¢
Mill Board, 1-16 inch thick and less.....2½¢
Per roll
Rosin Sized Sheathing: 500 sq. ft. Light weight, 25 lbs. to roll 35@40¢
Medium weight, 30 lbs. to roll, 40@45¢
Heavy weight, 40 lbs. to roll.. 56@60¢
Black Water Proof Sheathing, 500 sq. ft., 1 ply, 65¢; 2 ply, 85¢; 3 ply, $1.10; 4 ply, $1.25.
Deafening Felt, 9, 6 and 4½ sq. ft. to lb. ton.....$38.00@40.00
Red Rope Roofing, 250 sq. ft. per roll.....$1.75

Tarred Paper—

1 ply (roll 300 sq. ft.), ton.....$32.50@35.50
2 ply, roll 108 sq. ft.....55@60¢
3 ply, roll 108 sq. ft.....78@85¢
Slater's Felt (roll 500 sq. ft.).75¢
R. R. M. Stone Surfaced Roofing (roll 110 sq. ft.).....$2.75

Sand and Emery—

Flint Paper and Cloth.60@60&10%
Garnet Paper and Cloth....25%
Emery Paper and Cl'h.50&10@60%

Parers— Apple—

Advance	℔ doz.	$4.00
Baldwin	℔ doz.	$4.00
Bonanza Improved	each	$6.50
Daisy	℔ doz.	$4.00
Dandy	each	$7.50
Eureka Improved	each	$20.00
Family Bay State	℔ doz.	$15.00
Improved Bay State	℔ doz.	$36.00
Little Star	℔ doz.	$5.00
New Lightning	℔ doz.	$7.00
Reading 72	℔ doz.	$3.25
Reading 78	℔ doz.	$6.25
Rocking Table	℔ doz.	$6.20
Turn Table '98	℔ doz.	$6.00
White Mountain	℔ doz.	$5.00

Potato—

Saratoga ..... ℔ doz. $7.00
White Mountain ..... ℔ doz. $6.00

Picks and Mattocks—

List Feb. 23, 1899..70&10@75&10%

Pinking Irons—

See *Irons, Pinking.*

Pins, Escutcheon—

Brass .....60@60&10%
Iron, list Nov. 11, '85..60@60&10%

Pipe, Cast Iron Soil—

Standard, 2-6 in.....50&10%
Extra Heavy, 2-6 in.....65%
Fittings 70%

Pipe, Merchant—

Carload Lots.

	Steel.		*Iron.*	
	Blk.	*Galv.*	*Blk.*	*Galv.*
⅛ & ¼ in..	*69%*	*53%*	*67%*	*51%*
⅜ & ½ in..	*73%*	*61%*	*71%*	*59%*
¾ to 6 in..	*77%*	*67%*	*75½%*	*65½%*
7 to 12 in..	*72%*	*57%*	*70½%*	*55%*

Pipe, Sewer—

Jobbers' Prices—
Standard Pipe and Fittings, 2 to 24 in.:
New England.....67%
New York and New Jersey.70%
Maryland, Delaware, E. Pa.72%
West. Pa. and West Va...73%
Virginia 75%
Ohio, Michigan and Ky....75%
Indiana 77%
NOTE.—Carload lots are generally delivered.

Pipe, Stove—

Edwards' Nested Stove Pipe:	C. L.	L. C. L.
5 in., per 100 joints	$7.00	$8.00
6 in., per 100 joints	7.50	8.50
7 in., per 100 joints	8.50	9.50

Planes and Plane Irons—

Wood Planes—

Bench, first qual.....40&10%
Bench, Second qual.....50&10%
Molding .....33⅓&10%
Bailey's (Stanley R. & L. Co.).....5&10@25&10&10%

Chapin-Stephens Co.:
Bench, First Quality.....40@40&10%
Bench, Second Quality....50@50&10%
Molding .....33⅓@33⅓&10%
Toy and German.....40@40&10%
Chaplin's 60%
Ohio Tool Co.:
Bench, First Quality.....40@40&10%
Bench, Second Quality....50@50&10%
Molding .....33⅓@33⅓&10%
Adjustable Wood Bottom.....60%
Union 60%

Iron Planes—

Bailey's (Stanley R. & L. Co.).....25&10@25&10&10%
Chaplin's Iron Planes.....50&10%
Miscellaneous Planes (Stanley R. & L. Co.).....20&10@20&10&10%
Ohio Tool Co.'s Iron Planes.....60%
Sargent's .....60&10%
Union 60%

Plane Irons—

Wood Bench Plane Irons.....25&10@30%
Buck Bros.....30%
Chapin-Stephens Co.....30@30&10%
Ohio Tool Co.....30%
Stanley R. & L. Co..20&10@20&10&10%
Union 50%
L. & I. J. White.....20&5@25%

Planters, Corn, Hand—

Kohler's Eclipse.....℔ doz. $8.50

Plates—

Felloe .....lb. 3¾@4¼¢
Self-Sealing Pie Plates (S., S. & Co.), ℔ doz. $2.00.....50%

Pliers and Nippers—

Button Pliers.....75&10@80%
Gas Burner, per doz., 5 in., $1.25 @ $1.30; 6 in., $1.45 @ $1.50.
Gas Pipe.. 7 in. $2.00, 8 in. $2.25, 10 in. $3.00, 12-in. $3.75
Acme Nippers.....50@50&5%
Cronk & Carrier Mfg. Co.:
American Button.....75&10%
Cronk's 60%
Improved Button.....60&10%
Stub's Pattern.....50%
Combination and others.....33⅓%
Heller's Farriers' Nippers, Pincers and Tools.....40&10@40&10&10%
P., S. & W. Tinners' Cutting Nippers .....30@30&10%
Swedish Side, End and Diagonal Cutting Pliers.....50%
Utica Drop Forge & Tool Co.:
Pliers and Nippers, all kinds.....40%

Plumbs and Levels—

Chapin-Stephens Co.:
Plumbs and Levels.....30@30&10&10%
Chapin's Imp. Brass Cor.40@40&10&10%
Pocket Levels.....30@30&10&10%
Disston's Plumbs and Levels.....70%
Disston's Pocket Levels.....70%
C. E. Jennings & Co.'s Iron.....33⅓%
C. E. Jennings & Co.'s Iron, Adjustable .....40&7½%
Stanley R. & L. Co..30&10@30&10&10%
Stanley's Duplex.....20@20&10&10%
Woods' Extension.....33⅓%

Poachers, Egg—

Buffalo Steam Egg Poachers, ℔ doz., No. 1, $6.00; No. 2, $9.00; No. 3, $9.00; No. 4, $12.00.....50%

Points, Glaziers'—

Bulk and 1-lb. papers....lb. 8 ¢
½-lb. papers.....lb. 8¾¢
¼-lb. papers.....lb. 9½¢

Pokes, Animal—

Ft. Madison Hawkeye.....℔ doz. $3.25
Ft. Madison Western.....℔ doz. $4.00

Police Goods—

Manufacturers' Lists...25@25&5%
Tower's 25%

Polish—Metal—

Prestoline Liquid, No. 1 (½ pt.), ℔ doz., $3.00; No. 2 (1 qu.), $9.72....40%
Prestoline Paste.....40&10%
George William Hoffman:
U. S. Metal Polish Paste, 3 oz. boxes, ℔ doz. 50¢; ℔ gro. $4.50; ½ lb boxes, ℔ doz. $1.25; 1 lb boxes ℔ doz. $2.25.
U. S. Liquid, 8 oz. cans, ℔ doz., $1.25; ℔ gro. $12.00.
Barkeepers' Friend Metal Polish, ℔ doz., $1.75; ℔ gro., $18.00.
Wynn's White Silk, ½ pt. cans, ℔ doz. $2.00

Stove—

Black Eagle Benzine Paste, 5 lb cans, ℔ lb 10¢
Black Eagle, Liquid, ⅛ pt. cans.. ℔ doz. 75¢
Black Jack Paste, ¾ lb cans, ℔ gr. $9.00
Black Kid Paste, 5 lb can....each, $0.65
Ladd's Black Beauty, gr. $10.00.....50%
Joseph Dixon's, ℔ gr. $5.75.....10%
Dixon's Plumbago.....℔ lb 8¢
Fireside .....℔ gr. $2.50
Gem, ℔ gr. $4.50.....10%
Japanese .....℔ gr. $3.50
Jet Black.....℔ gr. $3.50
Peerless Iron Enamel, 10 oz. cans.. ℔ doz. $1.50
Wynn's:
Black Silk, 5 lb pail.....each 70¢
Black Silk, ½ lb box.....℔ doz. $1.00
Black Silk, 5 oz. box.....℔ doz. $0.75
Black Silk, ½ pt. liq.....℔ doz. $1.00

Poppers, Corn—

1 qt., Square.....gro. $9.00
1 qt., Round.....gro. $10.00
1½ qt., Square.....gro. $11.00
2 qt., Square.....gro. $13.00

Post Hole and Tree Augers and Diggers—

See also *Diggers, Post Hole, &c.*

Posts, Steel—

Steel Fence Posts, each, 5 ft., 42¢; 6 ft., 46¢; 6½ ft., 48¢.
Steel Hitching Posts.....each $1.30

Potato Parers—

See *Parers, Potato.*

Pots, Glue—

Enameled 40%
Tinned 35%

Powder—

In Canisters:
Duck, 1 lb.....each 45¢
Fine Sporting, 1 lb....each 75¢
Rifle, ½-lb.....each 15¢
Rifle, 1-lb.....each 25¢
King's Semi-Smokeless:
Keg (25 lb bulk).....$6.50
Half Keg (12½ lb bulk).....3.50
Quarter Keg (6¼ lb bulk).....1.90
Case 24 (1 lb cans bulk).....8.50
Half case (1 lb cans bulk).....4.50

King's Smokeless:	Shot Gun.	Rifle.
Keg (25 lb bulk)	$12.00	$15.00
Half Keg (12½ lb bulk)	6.25	7.75
Quarter Keg (6¼ lb bulk)	3.25	4.00
Case 24 (1 lb cans bulk)	14.00	17.00
Half case 12 (1 lb c. bk)	7.25	8.75

Robin Hood Sm'less Shot Gun..50&20%

Presses—

Fruit and Jelly—

Enterprise Mfg. Co.....20@25%

Seal Presses—

Morrill's No. 1, ℔ doz., $20.00.....50%

Pruning Hooks and Shears

See *Shears.*

Pullers, Cork—

Invincible Cork Puller.....$21.00

Pullers, Nail—

Cyclops 50%
Miller's Falls, No. 3, ℔ doz., $12.00.....33⅓&10%
Morrill's No. 1, Nail Puller, ℔ doz. $20.00 .....50%
Pearson No. 1, Cyclone Spike Puller, each $30.00.....50%
Pelican, ℔ doz. $9.00.....40&10%
Scranton, Case Lots:
No. 2B (large).....$5.50
No. 3B (small).....5.00
Smith & Hemenway Co.:
Diamond B, No. 2, case lots.....℔ doz. $6.00
Diamond B, No. 3, case lots.....℔ doz. $5.50
Giant No. 1, ℔ doz. $18; No. 2, $16.50; No. 3, $15.....40%

Pulleys, Single Wheel—

Inch	*2*	*2½*	*3*
Awning, doz.	*$0.55*	*.85*	*1.15*
Hay Fork, Swivel or Solid Eye. doz., 4 in., $1.05; 5 in., $1.35			
Inch	*2*	*2¼*	*2½*
Hot House, doz.	*$0.70*	*.90*	*1.25*
Inch	*1¼*	*1½*	*1¾* *2*
Screw, doz.	*$0.16*	*.19*	*.23* *.30*
Inch	*1¾*	*2*	*2¼* *2½*
Side, doz.	*$0.30*	*.40*	*.55* *.65*
Inch	*1½*	*1¾*	*2* *2½*
Tackle, doz.	*$0.30*	*.42*	*.58* *1.00*

Stowell's:
Ceiling or End, Anti-Friction..60&10%
Dumb Waiter, Anti-Friction..60&10%
Electric Light.....60%
Side, Anti-Friction.....60&10%

Sash Pulleys—

Common Frame; Square or Round End, per doz, 1¾ and 2 in.....16@19¢
Auger Mortise, no Face Plate, per doz., 1¾ and 2 in..16@19¢
Acme.....1¾ in., 16¢; 2 in., 19¢
Fox-All-Steel, Nos. 3 and 7, 2 in.... ℔ doz. 50%
Grand Rapids All Steel Noiseless..50%
Ideal .....70&10%
Niagara.....1¾ in. 16¢; 2 in., 19¢
No. 26, Troy..1¾ in., 14½¢; 2 in., 16½¢
Star.....1¾ in., 16¢; 2 in., 19¢
Tackle Blocks—See Blocks.

Pumps—

Cistern .....60@60&10%
Pitcher Spout.....80@80&5%
Wood Pumps, Tubing, &c..45@50%
Barnes Dbl. Acting (low list)..50&10%
Barnes' Pitcher Spout.....80%
Contractors' Rubber Diaphragm No. 2, B. & L. Block Co.....$16.00
Daisy Spray Pump.....℔ doz. $7.20
Flint & Walling's, Fast Mail Hand, (low list).....55%
Flint & Walling's Fast Mail (low list) .....55&5%
Flint & Walling's Tight Top Pitcher.80%
National Specialty Mfg. Co., Measuring, $6.00.....30%
Mechanical Sprayer.....$7.20
Myers' Pumps (low list).....50%
Myers' Power Pumps.....50%
Myers' Spray Pumps.....50%

Pump Leathers—

Plunger and Lower Valve—Per gro.:

Inch...	*2*	*2¼*	*2½*	*2¾*
	$2.20	*2.50*	*2.75*	*3.00*
Inch...	*3*	*3¼*	*3½*	*3¾* *4*
	$3.30	*3.60*	*3.85*	*4.10* *4.40*

Plunger Cup Leathers—Per 100:

Inch...	*2½*	*3*	*3½*	*4*
	$2.75	*3.85*	*5.00*	*6.00*

Punches—

Saddlers' or Drive, good..... doz. 50@75¢
Spring, single tube, good quality .....$1.75@2.00
Revolving (4 tubes) ..... doz. $3.50@3.75
Bemis & Call Co.'s Cast St'l Drive.50%
Bemis & Call Co.'s Check.....55%
Morrill's No. 1 (A.B.C.), ℔ doz. $15.50
No. 2, ℔ doz. $22.50.....50%
Hercules, each $7.50.....50%
Niagara Hollow Punches.....40%
Niagara Solid Punches.....55&10%
Steel Screw, B. & K. Mfg. Co.....50%
Tinners' Hollow, P., S. & W. Co.35@35&5%
Tinners' Solid, P., S. & W. Co., ℔ doz., $1.44.....60%

Rail—Barn Door, &c.—

Cast Iron Barn Door; Flange Screw Holes for Rd. Groove Wheels:

½	⅝	¾ in.	
$1.70	*$2.10*	*$3.00*	*100 feet.*

Angular for Sq. Groove Wheels:

Small.	*Med.*	*Large.*	
$1.50	*$1.90*	*$2.60*	*100 feet.*

Sliding Door, Iron Painted..... 2¼@2¾¢
Sliding Door, Wrought Brass, 1½ in., lb., 36¢.....30%
Allith Mfg. Co.:
No. 1, Reliable Hgr. Track, ℔ ft. 5½¢
No. 2, Reliable Hgr. Track, ℔ ft. 7¢
Cronk's:
Double Braced Steel Rail....℔ ft. 3¢
O. N. T. Rail.....2¾¢
Griffin's:
xxx, ℔ 100 ft., 1 x 3-16 in., $3.00; 1¼ x 3-16 in., 3.50.
Hinged Hanger, ℔ 100 ft., 1 x 3-16 in., $3.10; 1¼ x 3-16 in., $3.60.
Lane's:
Hinged Track, ℔ 100 ft., 1 in., $3.70; 1¼ in., $4.40.
O. N. T., ℔ 100 ft., 1 in., $2.75; 1¼ in., $3.50; 1½ in., $4.00.
Standard, 1¼ in.....℔ 100 ft. $4.00
Lawrence Bros.:
℔ 100 ft. No. 201, $4.00; No. 202, $4.40.
New York, 1 x 3-16 in., ℔ 100 ft. $2.75
McKinney's:
Hinged Hanger Rail, ℔ ft., 11¢..50%
None Better.....℔ ft. 3¾¢
Standard .....℔ ft. 4¢
Myers' Stavon Track.....60%
Richards' Mfg. Co.:
Common 1 x 3-16 in., $2.75; 1⅛ x 3-16, $3.25; 1¼ x 3-16, $3.50.
Special Hinged Hanger Rail.....$4.40
Fire Door Track, ℔ ft., 2½ x ⅝, 15¢; 3½ x ⅝, 9¢.
Lag Screw Rail, No. 65.....40%
Gauge Trolley Track, ℔ ft., No. 31, 10¢; No. 32, 15¢; No. 33, 24¢.
Safety Door Hanger Co.'s Storm King Safety.....60%
Safety Door Hanger Co.'s U. S. Standard 60%
Stowell's:
Cast Rail.....℔ ft. 1¾¢
Steel Rail, Plain.....25%
Wrought Bracket 1 3-16 in....℔ ft. 3¢
Wrought Bracket, 1½ x 5-16..℔ ft. 7¢
Swett's Hylo, ℔ ft. 11¢.....60%
P. L. R. Steel Rail.....℔ 100 ft. $3.00
No. 6, 1 x 3-16.....℔ 100 ft. $2.75

Rakes—

Net Prices, Malleable Rakes:

	10	*12*	*14*	*16-tooth*
Shank	*$1.50*	*1.60*	*1.75*	*1.85*
Socket	*$1.65*	*1.80*	*1.95*	*2.10*

Steel, Garden and Gravel, Aug. 1, '99, List.....70%
Malleable Iron, Garden...70&10%
Lawn Rakes, M'l'l Head, per doz.
20 teeth.....$3.25@3.50
24 teeth.....$3.50@3.75
Weldless Steel Garden.....75&5
Fort Madison Red Head Lawn....$3.25
Fort Madison Blue Head Lawn....$2.70
Jackson Lawn, 29 and 30 teeth, ℔ doz., net.....$4.25
Kohler's:
Lawn Queen, 20-tooth.....℔ doz. $3.45
Lawn Queen, 24-tooth.....℔ doz. $3.60
Paragon, 20-tooth.....℔ doz. $2.75
Paragon, 24-tooth.....℔ doz. $3.00
Steel Garden, 14-tooth....℔ doz. $2.88
Malleable Garden, 14-tooth, ℔ doz. $1.75@2.00

Rasps, Horse—

Disston's 75%
Heller Bros.'.....70&5@70&10&5%
McCaffrey's American St'd...60&10&5%
New Nicholson.....70&10@75%
See also Files.

Razors—

Borasic 60%
Fox Razors, No. 42..℔ doz. $20.00 } 40%
Fox Razors, No. 44..℔ doz. $20.00 }
Fox Razors, No. 82, Platina... ℔ doz. $25.00 }
Red Devil.....60%
Silberstein:
Carbo Magnetic.....$18.00
Griffon, No. 65.....$15.00
Griffon, No. 00.....$12.00
All other Razors.....40%

Safety Razors—

Silberstein 40%

Reels, Fishing—

Hendryx:
M 6, Q 6, A 6, B 6, M 9¾, M 16, Q 16, A 16, B 16, 4008, Rubber, Populo, Nickeled Populo.....20%
Aluminum, German Silv., Bronze.25%
1240 N, 124 N.....20%
3004 N, 06 N, 6 RM, G 9.....25%
4 N, 6 PN, 24 N, 26 PN.....20%
2904 P.....33⅓%
2904 PN.....33⅓%
0924 N.....33⅓%
02084 N.....33⅓%
002904 PN.....33⅓%
802 N.....33⅓%
986 PN, 2904 N, 974 PN.....25%
5009 PN, 5009 N.....20%
Competitor 102 P, 102 PN, 202 P, 202 PN, 102 PR, 202 PR.....20%
304 P, 304 PN, 00304 P, 00304 PN.33⅓%

Registers—*List July 1, 1903.*

Black Jap
White Jap
Bronzed } *See Trade Report.*
Nickel Plated
Electro Plated

Revolvers—

Single Action.....85@90¢
Double Action, except 44 cal.$1.00
Double Action, 44 caliber....$2.05
Automatic $3.60
Hammerless $4.10
NOTE.—Jobbers frequently cut the above prices of manufacturers for small trade.

Riddles, Hardware Grade

16 in.....per doz. $2.25@2.50
17 in.....per doz. $2.50@2.75
18 in.....per doz. $2.75@3.00

Rings and Ringers—

Bull Rings—

	2	2½	*3 inch.*
Steel	*$0.70*	*0.75*	*0.80 doz.*
Copper	*$1.00*	*1.15*	*1.40 doz.*

Rea's Improved Self-Piercing, Copper, 2 in., ℔ doz., $1.25; 2½ in., $1.50; 3 in., $1.75.

Hog Rings and Ringers—

Hill's Rings, gro. boxes, $4.00@4.25
Hill's Ringers, Gray Iron..... doz. 50@55¢
Hill's Ringers, Malleable Iron.. doz. 70@75¢
Blair's Rings...per gro. $4.75@5.00
Blair's Ringers..per doz. $0.60@ .65
Brown's Rings..per gro. $5.00@5.25
Brown's Ringers.per doz. $0.65@ .70

Rivets and Burrs—

Copper .....60@60&5%
Iron or Steel.....75@75&5%

Rollers—

Acme, Stowell's Anti-Friction.....50%
Barn Door, Sargent's list.....60%
Cronk's Stay.....72¢
Cronk's Brinkerhoff.....90¢
Lane's Stay.....40%
Richards' Stay:
Handy Adj. and Reversible No. 53.50%
O. K. Adj. and Reversible, No. 58.50%
Lag Screw, Nos. 55 and 57.....50%
Fire Door, No. 59.....40%
Favorite, No. 54.....40%
Stowell's Barn Door Stay..℔ doz. $1.00
Swett's Anti-Friction.....50%
Screw and Spike Stay.....℔ doz. 65¢
Hinge Adjustable Stay.....℔ doz. 90¢

Rope—

Manila, 7-16 in. diam. and larger:
Mixed .....lb., 11@11½¢
Pure .....lb., 12¼@12½¢
Sisal, 7-16 in. diam. and larger:
Mixed .....lb., 8¾¢
Pure .....lb., 9¾@10¢
Sisal, Hay, Hide and Bale Ropes, Medium and Coarse:
Mixed .....lb., 8¾¢
Pure .....lb., 9¾@10¢

Sisal, Tarred, Medium Lath Yarn:
Mixed ..... *lb., 8 ¢*
Pure ..... *lb., 9¼@9½¢*
Cotton Rope: *Lb.*
Best, ¼-in. and larger ..... *16½¢*
Medium, ¼-in. and larger ..... *14½¢*
Common, ¼-in. and larger ..... *10½¢*
Jute Rope:
Thread No. 1, ¼-in. & up. lb. *6½¢*
Thread No. 2, ¼-in. & up, lb. *5½¢*
Old Colony Manila Transmission Rope ..... ℔ lb 17½¢

Wire Rope—

Galvanized ..... *47½&5%*
Plain ..... *55&5%*

Ropes, Hammocks—

Covert Mfg. Co.:
Jute ..... 50&5%
Sisal ..... 35&5%
Covert Saddlery Works ..... 60&5%

Rules—

Boxwood ..... *60&10&10%*
Ivory ..... *35&10@35&10&5%*
Chapin-Stephens Co.:
Boxwood ..... 60@60&10%
Ivory ..... 35@35&10&10%
Miscellaneous ..... 50@50&10&10%
Combination ..... 55@55&10&10%
Stationers' ..... 10@10&10%
Keuffel & Esser Co.:
Folding, Wood ..... 35&10%
Folding, Steel ..... 33⅓&10%
Lufkin's Steel ..... 50&10%
Lufkin's Lumber 70%
Stanley R. & L. Co.:
Boxwood ..... 60@60&10%
Ivory ..... 35@35&10&10%
Upson Nut Co.:
Boxwood ..... 60@60&10%
Ivory ..... 35&10@35&10&10%

Sash Balances—

See *Balance, Sash.*

Sash Locks—

See *Locks, Sash.*

Sash Weights—

See *Weights, Sash.*

Sausage Stuffers or Fillers

See *Stuffers or Fillers, Sausage.*

Saw Frames—

See *Frames, Saw.*

Saw Sets—See *Sets, Saw.*

Saw Tools—See *Tools, Saw.*

Saws—

Atkins':
Circular 50%
Band ..... 50&10@60%
Cross Cuts ..... 35&5%
Mulay, Mill and Drag 50%
One-Man Saw 40%
Wood Saws 40%
Hand, Compass, &c 40%
Chapin-Stephens Co.:
Turning Saws and Frames ..... 30@30&10%
Diamond Saw & Stamping Works:
Sterling Kitchen Saws ..... 30&10&5%
Disston's:
Circular, Solid and Ins'ted Tooth 50%
Band, 2 to 14 in. wide 60%
Band, ⅛ to 1⅝ 60%
Crosscuts 50%
Narrow Crosscuts 55%
Mulay, Mill and Drag 50%
Framed Woodsaws 35%
Woodsaw Blades 35%
Woodsaw Rods 25%
Hand Saws, Nos. 12, 99, 9, 16, d100, D8, 120, 76, 77, 8 ..... 25%
Hand Saws, Nos. 7, 107, 107½, 3, 1, 0, 00, Combination 30%
Compass, Key Hole, &c 25%
Butcher Saws and Blades 35%
C. E. Jennings & Co.'s:
Back Saws 25%
Butcher Saws 30%
Compass and Key Hole Saws ..... 35&5%
Framed Wood Saws 30%
Hand Saws ..... 20&2½%
Wood Saw Blades 35%
Millers Falls:
Butcher Saws ..... 15&10%
Star Saw Blades ..... 15&10%
Peace & Richardson's Hand Saws 30%
Simonds':
Circular Saws 50%
Crescent Ground Cross Cut Saws 35%
One-Man Cross Cuts ..... 40&10%
Gang Mill, Mulay and Drag Saws 50%
Band Saws 50%
Hack Saws ..... 25@25&7½%
Butcher Saws ..... 35@35&7½%
Hand Saws ..... 25@25&7½%
Hand Saws, Bay State Brand 45%
Compass, Key Hole, &c ..... 25@25&7½%
Wood Saws ..... 35@35&7½%
Springfield Mach. Screw Co.:
Diamond Kitchen Saws ..... 40&10@50%
Butcher Saws Blades ..... 35@40%
Wheeler, Madden & Clemson Mfg. Co.'s Cross Cut Saws 50%

Hack Saws—

Atkins' Hack Saw Blades A A A 25%
Disston's:
Concave Blades 25%
Keystone 40%
Hack Saw Frames 30%
Fitchburg File Works, The Best 25%
C. E. Jennings & Co.'s:
Hack Saw Frames, Nos. 175, 180 ..... 40&7½%
Hack Saws, Nos. 175, 180, complete, ... 40&7½%
Goodell's Hack Saw Blades 40%
Griffin's Hack Saw Frames ..... 35&5&10%
Griffin's Hack Saw Blades ..... 35&5&10%
Springfield Mach. Screw Co.:
Diamond Hack Saw Blades 35%
Diamond Hack Saw Frames 50%
Star Hack Saws and Blades ..... 15&10%
Sterling Hack Saw Blades 35%
Sterling Hack Saw Frames ..... 30&10&5%

Scroll—

Barnes' No. 7, $15 ..... 25%
Barnes' Scroll Saw Blades 40%
Barnes' Velocipede Power Scroll Saw, without boring attachment, $18; with boring attachment, $20 ..... 20%
Lester, complete, $10.00 ..... 15&10%
Rogers, complete, $4.00 ..... 15&10%

Scalers, Fish—

Covert's Saddlery Works ..... 60&10%

Scales—

Family, Turnbull's ..... *50@50&10%*
Counter:
Hatch, Platform, ½ oz. to 4 lbs. ..... *doz. $5.50*
Two Platforms, ½ oz. to 8 lbs. ..... *doz. $16.00*
Union Platform, Plain. *$1.70@1.90*
Union Platform, Stpd. *$1.85@2.15*
Chatillon's:
Eureka 25%
Favorite 40%
Crocers' Trip Scales 50%
Chicago Scale Co.:
The "Little Detective" ..... 25 lbs 50%
Union or Family No. 2 ..... 60%
Portable Platform (reduced list) 50%
Wagon or Stock (reduced list) ..... 25@35%
"The Standard" Portables 50%
"The Standard" R. R. and Wagon 50%

Scrapers—

Box, 1 Handle ..... *doz. $2.00@2.25*
Box, 2 Handle ..... *doz. $2.60@2.85*
Ship ..... *Light, $2.00; Heavy, $4.50*
Adjustable Box Scraper (S. R. & L. Co.), $6.00 ..... 30@30&10%
Chapin-Stephens Co., Box ..... 50@50&10%

Screens, Window and Frames—

Flyer Pattern Screens ..... 60&5@60&5&2½%
Maine Screen Frames ..... 40&10&5%
Perfection Screens ..... 60&5@60&5&2½%
Phillips' Screen Frames ..... 60&5@60&5&2½%
See also *Doors.*

Screws—Bench and Hand

Bench, Iron, doz., 1 in., $2.50@2.75; 1⅛, $3.00@3.25; 1¼, $3.50@3.75
Bench, W'd, Beech ..... *doz. 30@30&5%*
Hand, Wood ..... *30@30&5%*
R. Bliss Mfg. Co., Hand ..... 30@30&10%
Chapin-Stephens Co., Hand ..... 30@30&10%
Ohio Tool Co., Bench and Hand 30%

Coach, Lag and Hand Rail

Lag, Common Point, list Oct. 1, '99 ..... *80@80&10%*
Coach and Lag, Gimlet Point, list Oct. 1, '99 ..... *75&10&5@80&5%*
Hand Rail, list Jan. 1, '81 ..... *70&10@75%*

Jack Screws—

Standard List ..... *75&10@80&5%*
Millers Falls ..... 50&10&10%
Millers Falls, Roller ..... 50&10%
P., S. & W. ..... 50@50&5%
Sargent ..... 70&10%
Swett Iron Works ..... 75&10@80&5%

Machine—

List Jan. 1, '98:
Flat or Round Head, Iron ..... *50@50&10%*
Flat or Round Head, Brass ..... *50@50&10%*

Set and Cap—

Set (Iron or Steel) ..80%
Sq. Hd. Cap 75%
Hex. Hd. Cap 75%
Rd. or Fillister Hd. Cap 65%
} *Extras freely given.*

Wood—

List July 23, 1903.
Manufacturers' printed discounts:
Flat Head, Iron ..... *87½&10@..%*
Round Head, Iron ..*85 &10@..%*
Flat Head, Brass ...*85 &10@..%*
Round Head, Brass ..*80 &10@..%*
Flat Head, Bronze ...*77½&10@..%*
Round Head, Bronze .*75 &10@..%*
Drive Screws ..... *87½&10%*

Scroll Saws—

See *Saws, Scroll.*

Scythes—

Per doz.
Prices announced for next season:
Clipper Pattern, Grass *$6.20*
Full Polished, Clipper *$6.75*
Grain *$8.00*
Clipper, Grain *$8.25*
Weed and Bush *$6.25*

Seeders, Raisin—

Enterprise ..... 25@30%

Sets—Awl and Tool—

Brad Awl and Tool Sets:
Wood Handle, 10 Awls ..... *doz. $2.00@2.25*
Wood Handle, 14 Awls, 6 Tools ..... *doz. $2.50@2.60*
Aiken's Sets, Awl and Tools:
No. 20, ℔ doz. $10.00 ..... 50&10&10%
Fray's Adj. Tool Handles, Nos. 1, $12; 2, $18; 3, $12; 4, $9; 5, $7 ..... 50%
C. E. Jennings & Co.'s Model Tool Holders 30%
Millers Falls Adj. Tool Handles, No. 1, $12; No. 4, $12; No. 5, $18 ..... 15&10%
Stanley's Excelsior:
No. 1, $7.50; No. 2, $4.00; No. 3, $5.50 ..... 30@30&10&10%

Garden Tool Sets—

Ft. Madison Three Plows, Hoe, Rake and Shovel ..... ℔ doz sets $9.00

Nail—

Square ..... *per gro. $2.25@2.50*
Round, Blk. and Pol., assorted, gro. $1.80@2.00
Octagon ..... *gro. $3.50@3.75*
Buck Bros. 27½%
Cannon's Diamond Point, ℔ gro. $12 ..... 25%
Mayhew's ..... ℔ gro. $9.00
Snell's Cannon's Diamond Point ..... ℔ gro. $7.20
Snell's Cor'gated, Cup Pt. ..... ℔ gro. $7.20
Snell's Knurled, Cup Pt. ..... ℔ gro. $7.20
Springfield Mach. Screw Co.:
Diamond Knurled Cup Pt. ℔ gro. $7.50

Rivet—

Regular list ..... *75@75&10%*

Saw—

Aiken's:
Genuine ..... 50&10%
Imitation ..... 50&10%
Atkin's:
Criterion 40%
Adjustable 40%
Bemis & Call Co.'s:
Cross Cut 30%
Plate 20%
Disston's Star and Monarch 25%
Morrill's No. 1, $15.00 ..... 50%
Nos. 3 and 4, Cross Cut, $20.63 ..... 50%
No. 5, Mill, $30.00 ..... 50%
Nos. 10, 11, 95, $15.63 ..... 50%
No. 1 Old Style, $10.00 ..... 50%
Special, $16.25 ..... 50%
Giant Royal, Cross Cut ..... ℔ doz. $8.50
Royal, Hand ..... ℔ doz. $5.00
Taintor Positive ..... ℔ doz. $6.75

Shaving—

Fox Shaving Sets, No. 30 ..... ℔ doz., net, $24.00

Sharpeners, Knife—

Chicago Wheel & Mfg. Co. 65%

Shaves, Spoke—

Iron ..... *doz. $1.00@1.15*
Wood ..... *doz. $1.75@2.00*
Bailey's (Stanley R. & L. Co.) ..... 30@30&10&10%
Chapin-Stephens Co. ..... 30@30&10&10%
Goodell's ℔ doz. $9.00 ..... 15&10%
Wood's F1 and F2 ..... 50%

Shears—

Cast Iron ..	7	8	9 *in.*	
Best	*$16.00*	*18.00*	*20.00*	*gro.*
Good	*$13.00*	*15.00*	*17.00*	*gro.*
Cheap ..	*$5.00*	*6.00*	*7.00*	*gro.*

Straight Trimmers, &c.:
Best quality, Jap .... 70@70&10%
Best quality, Nickel .. 60@60&10%
Fair quality, Jap .... 80@80&5%
Fail quality, Nickel .. 75@75&10%
Tailors' Shears ..... *40@40&10%*
Acme Cast Shears ..... 40@40&5%
Heinisch's Tailor's Shears 10%
Wilkinson's Hedge, 1900 list 45%
Wilkinson's Branch, Lawn & Border 40%
Wilkinson's Sheep, 1900 list 50%

Tinners' Snips—

Steel Blades ..... *20&5@20&10%*
Steel Laid Blades ..... *40&10@50%*
Forged Handles, Steel Blades, Berlin ..... 40@40&10%
Heinisch's Snips 40%
Jennings & Griffin Mfg. Co.'s, 6½ to 10 in. 50%
Niagara Snips 40%
P. S. & W. Co. 20%

Pruning Shears and Tools

Cronk's Grape Shears 33⅓%
Cronk's Pruning Shears 33⅓%
Disston's Combined Pruning Hook and Saw, ℔ doz. $18.00 ..... 25%
Disston's Pruning Hook, ℔ doz. $12.00 ..... 25%
John T. Henry Mfg. Co.:
Pruning Shears, all grades ..... 40@40&5%
Orange Shears ..... 50&10@50&20%
Grape ..... 40&10@50%
Tree Pruners 75%
P., S. & W. Co. 33⅓%

Sheaves—Sliding Door—

Stowell's Anti-Friction 50%
Patent Roller, Hatfield's, Sargent's list ..... 70&10%
Reading 60%
R. & E. list 33⅓%
Wrightsville Hatfield Pattern 80%

Sliding Shutter—

Reading list ..... 45&20%
R. & E. list 33⅓%
Sargent's list ..... 50&10%

Shells—Shells, Empty—

Brass Shells, Empty:
First quality, all gauges ..... 60&5%
Climax, Club, Rival, 10 and 12 gauge ..... 65&5%
Paper Shells, Empty:
Acme, Ideal, Leader, New Rapid, Magic, 10, 12, 16 and 20 gauge ..... 25&5%
Blue Rival, New Climax, Challenge, Monarch, Defiance, Repeater, Yellow Rival, 10, 12, 16 and 20 gauge 20%
Climax, Union, League, New Rival, 10 and 12 gauge 25%
Climax, Union, League, New Rival, 14, 16 and 20 gauge ($7.50 list) 20%
Expert, Metal Lined and Pigeon, 10, 12, 16 and 20 gauge ..... 33⅓&5%
Robin Hood, Low Brass ..... 20&10%
Robin Hood, High Brass ..... 30&10%

Shells, Loaded—

Loaded with Black Powder .. *40%*
Loaded with Smokeless Powder, medium grade ..... *40&5%*
Loaded with Smokeless Powder, high grade ..... *40&10&10%*
Robin Hood Smokeless Powder:
Robin Hood, Low Brass 50%
Comets, High Brass ..... 50&10&5%

Shoes, Horse, Mule, &c.—

F.o.b. Pittsburgh:
Iron ..... *per keg $4.00*
Steel ..... *per keg $3.75*
Burden's, all sizes ..... ℔ keg $3.90

Shot—

Drop, up to B, 25-lb. bag *$1.65*
Drop, B and larger ..... *per 25-lb. bag, $1.90*
Buck, 25-lb. bag *$1.90*
Chilled, 25-lb. bag *$1.90*

Shovels and Spades—

Association List, Nov. 15, 1902 .. *40%*

Sieves and Sifters—

Hunter's Imitation ..... *gro. $10.50@11.00*
Hunter's Genuine ..... *per gro. $12.00@12.50*
Buffalo Metallic Blued, S. S. Co., ℔ gr.:

14&16	16&18	18&20
$13.20	$13.50	$14.40

Shaker (Barler's Pat.) Flour Sifters, ℔ doz., $2.00 ..... 20%

Sieves, Seamless Metallic

	Per dozen.			
Mesh	*14*	*16*	*18*	*20*
Iron Wire ..	*$1.05*	*1.05*	*1.10*	*1.20*
Tinned Wire ..	*$1.15*	*1.15*	*1.20*	*1.30*

Sieves, Wooden Rim—

Nested, 10, 11 and 12 Inch.
Mesh 18, Nested .... *doz. $0.90@0.95*
Mesh 20, Nested .... *doz. $1.00@1.05*
Mesh 24, Nested .... *doz. $1.30@1.40*

Sinks, Cast Iron—

Standard list ..... *60@60&10%*
NOTE.—There is not entire uniformity in lists used by jobbers.

Skeins, Wagon—

Cast Iron ..... *80&10@80&10&10%*
Steel ..... *40@40&10%*

Slates, School—

Factory Shipments.
"D" Slates ..... *50@50&10%*
Eureka, Unexcelled Noiseless .. *60&5 tens*
Victor A, Noiseless ..... *60&4 tens &5%*

Slaw Cutters—See *Cutters.*

Snaps, Harness—

German ..... *40@40&10%*
Covert Mfg. Co.:
Derby ..... 30&5&2%
High Grade 45%
Jockey ..... 30&10%
Trojan 45%
Yankee ..... 30&5&2%
Yankee, Roller ..... 30&5&2%
Covert's Saddlery Works:
Crown 60%
German 60%
Model 60%
Triumph 60%
Oneida Community:
Solid Swivel 60%
Sargent's Patent Guarded ..... 66⅔&10%

Snaths—

Scythe *50%*

Snips, Tinners—See *Shears.*

Spoons and Forks—Silver Plated—

Good Quality ..... *50&10@60&5%*
Cheap ..... *60@60&10%*
International Silver Co.:
1847 Rogers Bros. and Rogers & Hamilton ..... 40&10%
Rogers & Bro., William Rogers' Eagle Brand ..... 50&10%
Anchor, Rogers Brand 60%
Wm. Rogers & Son ..... 60&10%

Miscellaneous—

German Silver ..... *60@60&5%*
Cattaraugus Cutlery Co.:
Seneca Silver 50%

Tinned Iron—

Teas ..... *per gro. 45@50¢*
Tables ..... *per gro. $0.90@$1.00*

Springs—Door—

Chicago (Coil) ..... 40&10%
Gem (Coil) 20%
Pullman (Coil) 20%
Reliance (Coil) ..... 40&10%
Star (Coil) 30%
Torrey's Rod, 39 in. ..... ℔ doz. $1.15
Victor (Coil) ..... 50&10&10%

Carriage, Wagon, &c.—

1¼ in. and Wider:	*Per lb*
Black	*4@4¼¢*
Half Bright	*4@4¼¢*
Bright	*4½@4¾¢*

Painted Seat Springs:
1½ x 2 x 26 ..... *per pr. 42¢*
1½ x 3 x 28 ..... *per pr. 70¢*

Sprinklers, Lawn—

Enterprise ..... 25@30%
Philadelphia No. 1, ℔ doz. $12; No. 2, $15; No. 3, $24 ..... 30%

Squares—

Nickel plated .. } *List Jan. 5, 1900.*
Steel and Iron . } 75@75&5%
Rosewood Hdl. Try Square and T-Bevels ..... *60&10&10@70%*
Iron Hdl. Try Squares and T-Bevels ..... *40&10@50&10&10%*
Disston's Try Sq. and T-Bevels 70%
Winterbottom's Try and Miter ..... 40&10@40&10&10%

Squeezers, Lemon

Wood, Common, gro.. No. 0, $5.25@$5.50; No. 1, $6.25@$6.50.
Wood, Porcelain Lined:
Cheap ..... *doz. $1.00*
Good Grade ..... *doz. $1.25*
Tinned Iron ..... *doz. $0.75@1.00*
Iron, Porcelain Lined ... *doz. $1.75*

Staples—

Barbed Blind ..... *lb. 6@6½¢*
Electricians', Association list .. *80&10&10&10%*
Fence Staples, Plain, $2.25; Galvanized *$2.55*
Poultry Netting Staples ..... *per lb. 3½@3½¢*
Grand Crossing Tack Co.'s list .. 80&10%

Steels, Butchers'—

Dick's 30%
Foster Bros.' 30%
C. & A. Hoffmann's 40%

Steelyards—.... *30@30&10%*

Stocks and Dies—

Blacksmiths' ..... *50@50&10%*
Curtis Rev'ble Ratchet Die Stock 25%
Derby Screw Plates 25%
Gardner Die Stocks No. 1 ..... 50%
Gardner Die Stocks, larger sizes 40%
Green River 25%
Lightning Screw Plate 25%
Little Giant 25%
Reece's New Screw Plates 25%

Stone—Scythe Stones—

Chicago Wheel & Mfg. Co.:
Gem Corundum, 10 in., $8.00 ℔ gro., 12 in., $10.80.
Norton Emery Scythe Stones:
Less than gross lots ..... ℔ gro. $9.00
One gross or more ..... ℔ gro. $7.20
Lots of 10 gross or more .. ℔ gro. $6.00

Pike Mfg. Co., 1901 list:
Black Diamond S. S. ℔ gro. $12.00
Lamoille S. S. ℔ gro. $11.00
White Mountain S. S. ℔ gro. $9.00
Green Mountain S. S. ℔ gro. $6.00
Extra Indian Pond S. S. ℔ gro. $7.50
No. 1 Indian Pond S. S. ℔ gro. $7.00
No. 2 Indian Pond S. S. ℔ gro. $4.50
Leader Red End S. S. ℔ gro. $4.50
Emery and Corundum, 10 in. ℔ gro. $9.00
Pure Corundum, 10 in. ℔ gro. $12
Crescent $7.00
Emery Scythe Rifles, 2 Coat, $8
Emery Scythe Rifles, 3 Coat, $10
Emery Scythe Rifles, 4 Coat, $12
Balance of 1904 list 33⅓%

Oil Stones, &c.—

Chicago Wheel & Mfg. Co., 1901 list:
Gem Corundum Oil, Double Grit 50%
Gem Corundum Axe, Single or Double Grit 55%
Gem Corundum Slips 55%
Gem Corundum Razor Hones 50%
Pike Mfg. Co., 1901 list: ℔ lb.
Arkansas St. No. 1, 3 to 5½ in. $2.80
Arkansas St. No. 1, 5½ to 8 in. $3.50
Arkansas Slips No. 1 $4.00
Lily White Washita, 4 to 8 in. 60¢
Rosy Red Washita, 4 to 8 in. 60¢
Washita St., Extra, 4 to 8 in. 50¢
Washita St., No. 1, 4 to 8 in. 40¢
Washita St., No. 2, 4 to 8 in. 30¢
Lily White Slips 90¢
Rosy Red Slips 90¢
Washita Slips, Extra 80¢
Washita Slips, No. 1 70¢
Washita Slips, No. 2 40¢
India Oil Stones (entire list) 33⅓%
Quickcut Emery and Corundum Oil Stone, Double Grit 33⅓%
Quickcut Emery and Corundum Axe Stone, Double Grit 33⅓%
Quickcut Emery Rubbing Bricks 33⅓%
Hindostan No. 1, R'g'lar ℔ lb. 80¢
Hindostan No. 1, Small ℔ lb. 100¢
Axe Stones (all kinds) 33⅓%
Turkey Oil Stones, Extra, 5 to 8 in. ℔ lb. 80¢
Queer Creek Stones, 4 to 8 in. 20¢
Queer Creek Slips 40¢
Sand Stone 6¢
Belgian, German and Swaty Razor Hones 50%
Natural Grit Carving Knife Hones ℔ doz. $3.00
Quick Edge Pocket Knife Hones ℔ doz. $2.50
Mounted Kitchen Sand Stone. ℔ doz. $1.50

Stoners, Cherry—

Enterprise 25@30%

Stoppers, Bottle—

Victor Bottle Stoppers ℔ gro. $9.00

Stops— Bench—

Millers Falls 15&10%
Morrill's, ℔ doz., No. 1, $10.00 50%
Morrill's, No. 2, $12.50 50%

Door—

Chapin-Stephens Co. 60@60&10%

Plane—

Chapin-Stephens Co. 20%

Straps— Box—

Cary's Universal, case lots. 20&10&10%

Hame—

Covert's Saddlery Works 60&10%

Stretchers, Carpet—

Cast Iron, St'l Points. doz. 55@60%
Socket doz. $1.75
Excelsior Stretcher and Tack Hammer Combined, ℔ doz. $6.00 20%

Stuffers, Sausage—

Enterprise Mfg. Co. 25@25&7½%
National Specialty Co., list Jan. 1, 1902 30&5%

Sweepers, Carpet—

National Sweeper Co.: ℔ doz.
Auditorium Roller Bearing (26 in. case), Nickel $54.00
Mammoth, Roller Bearing (30 in. case), Nickel $60.00
Marion, Roller Bearing, regular finishes, full Nickel $24.00
Marion Queen, Roller Bearing, full Nickel $24.00
Monarch, Roller Bearing, N'kel $22.00
Monarch, Roller B'r'g, Jap'ned $20.00
Transparent Roller Bearing, Plate Glass Top, Nickel $36.00
Monarch Extra, Roller Bearing, (17-in. case), Nickel $36.00
Monarch Extra, Roller Bearing (17-in. case), Japanned $33.00
National Queen, Fancy Veneers $77.00
Perpetual, Regular B'r'gs, Nkl. $20.00
Perpetual, Regular B'r'gs, Jap. $18.00

NOTE.—Rebates: 50c per dozen on three-dozen lots; $1 per dozen on five-dozen lots; $2 per dozen on ten-dozen lots; $2.50 per dozen on twenty-five-dozen lots

Tacks, Brads, &c.—

List Jan. 15, '99.
Carpet Tacks ..... 90&10&10@5%
American Cut Tacks .. 90&25@..%
Swedes Cut Tacks .. 90&30&10&5@..%
Swedes Upholsterers' Tacks .... 90&45&10&5@..%
Gimp Tacks ..... 90&45&10@..%
Lace Tacks ..... 90&45&10@..%
Trimmers' Tacks . 90&30&10&5@..%
Looking Glass Tacks . 70&10&5@..%
Bill Posters' and Railroad Tacks ..... 90&45&10@..%
Hungarian Nails .... 80&30&5@..%
Common and Patent Brads ... 80&10&5@..%
Trunk and Clout Nails . 80&10@..%

NOTE.—The above prices are for Straight Weights. An extra 5% is given on Star Weights** and an extra 10&5% on Standard Weights.****

Miscellaneous—

Double Pointed Tacks ..... 90&6 or 7 cns
Steel Wire Brads, R. & E. Mfg. Co.'s list 50&10@60%
See also Nails, Wire.

Tanks, Oil—

	Each.
Emerald, S., S. & Co.	30-gal. $3.40
Emerald, S., S. & Co.	60-gal. $4.25
Queen City, S., S. & Co.	30-gal. $3.65
Queen City, S., S. & Co.	60-gal. $4.50

Tapes, Measuring—

American Asses' Skin .. 40&10@50%
Patent Leather ..... 25@30&5%
Steel ..... 40@40&10%
Chesterman's ..... 25@25&5%
Eddy Asses' Skin ..... 40&10@50%
Eddy Patent Leather ..... 25@30&5%
Eddy Steel ..... 40@40&10%
Keuffel & Esser Co.:
Favorite, Ass Skin ..... 40&10@50%
Favorite, Duck and Leather ..... 25&5@25&10%
Metallic and Steel, lower list ..... 35@35&5%
Pocket ..... 35@35&5%
Lufkin's Steel ..... 33⅓@35%
Lufkin's Metallic ..... 30@30&5%

Teeth, Harrow—

Steel Harrow Teeth, plain or headed, ⅝-inch and larger ... per 100 lbs. $3.00

Thermometers—

Tin Case ..... 80&10@80&10&5%

Ties, Bale—Steel Wire—

Single Loop ..... 80&2½%
Monitor, Cross Head, &c. 70%

Brick Ties—

Niagara Brick Ties ..... 25&10%

Tinners' Shears, &c.—

See *Shears, Tinners', &c.*

Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.

Tips, Safety Pole—

Covert's Saddlery Works ..... 60&10%

Tire Benders, Upsetters, &c.

See *Benders and Upsetters, Tire.*

Tools—Coopers'—

L. & I. J. White ..... 20@20&5%

Hay—

Myers' Hay Tools 50%
Stowell's Hay Carriers 50%
Stowell's Hay Forks 50%
Stowell's Fork Pulleys 50%

Saw—

Atkins' Cross Cut Saw Tools 40%
Simonds' Improved 33⅓%
Simonds' Crescent 25%

Ship—

L. & I. J. White 25%

Transom Lifters—

See *Lifters, Transom.*

Traps—Fly—

Balloon, Globe or Acme, doz. $1.15@$1.25; gro .... $11.50@12.00
Harper, Champion or Paragon, doz. $1.25@1.50; gro. $13.00@13.50

Game—

Oneida Pattern .. 75&10@75&10&5%
Newhouse ..... 45@45&5%
Hawley & Norton 65%
Victor and Oneida ..... 70&10@70&10&5%
O. C. Jump (Blake Pat.) .. 60&5@60&10%

Mouse and Rat—

Mouse, Wood, Choker, doz. holes 8½@9¢
Mouse, Round or Square Wire, doz. 85@90¢
Marty French Rat and Mouse Traps (Genuine):
No. 1, Rat, each $1.21; ℔ doz. $13.25
No. 3, Rat, ℔ doz. $6.50; case of 50 $5.75 doz.
No. 3½, Rat, ℔ doz. $5.25; case of 72 ℔ gro. $4.70 doz.
No. 4, Mouse, ℔ doz. $3.85; case of 150 $3.00 doz.
No. 5, Mouse, ℔ doz. $3.00; case of 150 $2.25 doz.

Trimmers, Spoke—

Wood's E I 50%

Trowels—

Disston Brick and Pointing 30%
Disston Plastering 25%
Diston "Standard Brand" and Garden Trowels 35%
Kohler's Steel Garden Trowels, 5 in. ℔ gro. $1.80
Kohler's Steel Garden Trowels, 6 in. ℔ gro. $6.00
Never-Break Steel Garden Trowels.. ℔ gro. $6.00
Rose Brick and Plastering ..... 25&5%
Woodrough & McParlin, Plastering. 25%

Trucks, Warehouse, &c.—

B. & L. Block Co.:
New York Pattern ..... 50&10%
Western Pattern ..... 60&10%
Handy Trucks ..... ℔ doz. $16.00
Grocery ..... ℔ doz. $15.00
Daisy Stove Trucks, Improved Pattern ..... ℔ doz. $18.50
McKinney Trucks ..... each $10.00
Model Stove Trucks ..... ℔ doz. $18.50

Tubs, Wash— *No. 1 2 3*

Galvanized, per doz. $4.75 5.25 6.00
Galvanized Wash Tubs (S., S. & Co.):

No.	1	2	3	10	20	30
Per doz., net.	$5.70	6.30	7.20	6.60	7.20	8.10

Twine, Miscellaneous—

Flax Twine:	*BC.*	*B.*
No. 9, ¼ and ½-lb. Balls	*22@24¢*	
No. 12, ¼ and ½-lb. Balls	*18@20¢*	
No. 18, ¼ and ½-lb. Balls	*16@18¢*	
No. 24, ¼ and ½-lb. Balls	*16@18¢*	
No. 36, ¼ and ½-lb. Balls	*15@17¢*	
Chalk Line, Cotton ½-lb. Balls		*30¢*
Cotton Mops, 6, 9, 12 and 15 lb. to doz.		*9½@11¢*
Cotton Wrapping, 5 Balls to lb., according to quality.	*13½@20¢*	
American 2-Ply Hemp, ¼ and ½-lb. Balls	*13@14¢*	
American 3-Ply Hemp, 1-lb. Balls	*13@14¢*	
India 2-Ply Hemp, ¼ and ½-lb. Balls (Spring Twine)	*8¢*	
India 3-Ply Hemp, 1-lb. Balls..	*7@8¢*	
India 3-Ply Hemp, 1½-lb. Balls.	*6@7¢*	
2, 3, ¼ and 5-Ply Jute, ½-lb. Balls	*9@10¢*	
Mason Line, Linen, ½-lb. Bls.	*16¢*	
No. 26½ Mattress, ¼ and ½-lb. Balls	*37¢*	
Wool, 3 to 6 ply	*B 14¾¢; A 5¢*	

Vises—

Solid Box ..... 50&10@60%

Parallel—

Athol Machine Co.:
Simpson's Adjustable 40%
Standard 40%
Amateur 25%
Columbian Hdw. Co. 40%
Emmert Universal:
Pattern Makers' No. 1, $15.00; No. 2, $12.50; No. 3, $10.00.
Machinist and Tool Makers' No. 4, $12.50; No. 5, $7.00; No. 6, $10.00; No. 10, $21.50.
Jewelers No. 7 ..... $4.00
Fisher & Norris Double Screw .. 15&10%
Hollands':
Machinists' ..... 40@40&5%
Keystone ..... 65&5&70%
Lewis Tool Co. ..... 20@30%
Merrill's 20%
Millers Falls ..... 60&10%
Massey Vise Co.:
Clincher 40%
Perfect 20%
Lightning Grip 20%
Parker's:
Victor ..... 20@25%
Regulars ..... 20@25%
Vulcan's ..... 40@45%
Combination Pipe ..... 55@60%
Prentiss ..... 20@25%
Sargent's 40%
Smith & Hemenway Co.:
Machinists' 40%
Jewelers' 33⅓%
Snediker's X. L. 33⅓%
Stephens' 33⅓%

Saw Filers—

Disston's D 3 Clamp and Guide, ℔ doz. $30 25%
Perfection Saw Clamps, ℔ doz. ... $5.00
Reading 60%
Wentworth's Rubber Jaw, Nos. 1, 2 and 3 ..... 45&50%

Wood Workers—

Massey Vise Co.:
Lightning Grip 15%
Perfect 15%
Wyman & Gordon's Quick Action, 6 in., $6.00; 9 in., $7.00; 14 in., $8.00.

Miscellaneous—

Bignall & Keeler Combination Pipe Vise ..... 60&10%
Holland's Combination Pipe .. 60@60&5%
Massey's Quick Action Pipe 40%
Parker's Combination Pipe:
87 Series 60%
187 Series ..... 60&5%
No. 870 ..... 40%

Wads—*Price per M.*

B. E., 11 up ..... *60¢*
B. E., 9 and 10 ..... *70¢*
B. E., 8 ..... *80¢*
B. E., 7 ..... *80¢*
P. E., 11 up *$1.00*
P. E., 9 and 10 ..... *1.25*
P. E., 8 ..... *1.50*
P. E., 7 ..... *1.50*
Dis. 15%
Ely's B. E., 11 and larger . *$1.70@1.75*
Ely's P. E., 12 to 20 .... *$3.00@3.25*

Ware, Hollow—

Cast Iron, Hollow—

Stove Hollow Ware:
Enameled ..... 55&10@60%
Ground ..... 60&10@65%
Plain or Unground .. 65&10@70%
Country Hollow Ware, per 100 lbs. *$2.50*
White Enameled Ware:
Maslin Kettles 70%
Covered Wares
Tinned and Turned 40%
Enameled 50%
See also *Pots, Glue.*

Enameled—

Agate Nickel Steel Ware ..... 50&20%
Agate Nickel Steel Ware, Specials .. 60&15%
Iron Clad Ware ..... 70&10%
Lava, Enameled ..... 40&10%
Never Break Enameled 50%

Tea Kettles—

Galvanized Tea Kettles:

Inch	*6*	*7*	*8*	*9*
Each	*45¢*	*50¢*	*55¢*	*65¢*

Steel Hollow Ware—

Avery Spiders and Griddles .. 65@65&5%
Avery Kettles 60%
Porcelained ..... 50&5@50&10%
Never Break Spiders and Griddles .. 65&5%
Never Break Kettles 60%
Solid Steel Spiders and Griddles . 65&5%
Solid Steel Kettles 60%

Warmers, Foot—

Pike Mfg. Co., Soapstone .... 40@40&10%

Washboards—

Solid Zinc: ℔ doz.
Crescent, family size, bent frame. $3.00
Red Star, family size, stationary protector $3.00
Double Zinc Surface:
Saginaw Globe, family size, stationary protector $2.65
Cable Cross, family size, stationary protector $2.90
Single Zinc Surface:
Naiad, family size, open back, perforated $2.40
Saginaw Globe, protector, family size, ventilated back $2.25
Brass Surface:
Brass King, Single Surface, open back $3.00
Nickel Plate Surface:
No. 1001 Nickel Plate, Single Surface $3.00
Glass Surface:
Glass King, Single Surface, open back $3.00
Enamel Surface:
Enamel King, Single Surface, ventilated back $3.00

Washers—Leather, Axle—

Solid ..... 80&10@80&10&10%
Patent ..... 90@90&5%
Coil: ⅞ 1 1⅛ 1¼ *Inch.*
10¢ 11¢ 12¢ 13¢ *per box*

Iron or Steel—

Size bolt.... 5-16 ⅜ ½ ⅝ ¾
Washers $5.00 4.10 2.80 2.60 2.40
In lots less than one keg add ½¢ per lb.; 5-lb. boxes add ½¢ to list.

Cast Washers—

Over ½ inch, barrel lots ..... per lb. 1¾@2¢

Wedges—

Oil Finish ..... *lb. 2.15@2.30¢*

Weights—Hitching—

Covert Mfg. Co. ..... 40&2%
Covert's Saddlery Works ..... 60&10%

Sash—

Per ton, f.o.b. factory:
Eastern District .. *$22.50@24.00*
Southern Territory .. *$18.00@19.50*
Western and Central Districts market unsettled.

Wheels, Well—

8-in., $1.50@1.55; 10-in., $1.65@1.70; 12-in., $2.25@2.35; 14-in., $3.40@3.50.

Wire and Wire Goods—

Bright and Annealed:
6 to 9 ..... 80&5@80&7½%
10 to 18 ..... 80@80&5%
19 to 26 ..... 80&10@80&10&5%
27 to 36 ..... 80&5@80&10%
Galvanized:
6 to 9 ..... 77½@77½&5%
10 to 14 ..... 72½@72½&5%
15 to 16 ..... 75&7½@75&10&2½%
19 to 26 ..... 75&5@75&10%
27 to 36 ..... 72½&5@72&7½%
Coppered:
6 to 9 ..... 77½@77½&5%
10 to 14 ..... 77½@77½&7½%
15 to 18 ..... 75&10@75&10&2½%
19 to 26 ..... 75&10&5@80%
27 to 36 ..... 75@75&5%
Tinned:
6 to 14 ..... 77½@77½&7½%
15 to 18 ..... 75&5@75&10%
Annealed, Steel and Tinned, on Spools .. 70&10&10@70&10&10&10%
Brass and Copper on Spools ... 60&10@60&10&10%
Brass, list Feb. 26, '96 ..... 30&5%
Copper, list Feb. 26, '96 ..... 15%
Cast Steel Wire 50%
Wire Clothes Line, see Lines.
Wire Picture Cord, see Cord.

Bright Wire Goods—

List June 24, 1903 . 90&10&10&10@..%

Wire Cloth and Netting—

Galvanized Wire Netting ..... 80&15@80&17½%
Painted Screen Cloth, 100 ft., $1.20
Standard Galv. Hardware Grade:
Nos. 2, 2½ & 3 Mesh, sq. ft. 3 ¢
Nos. 4 and 5 Mesh, sq. ft. .. 3½¢
No. 6 Mesh, sq. ft. ..... 3½¢
No. 8 Mesh, sq. ft. ..... 4 ¢

Wire, Barb—See *Trade Report*

Wrenches—

Agricultural .... 75&10@75&10&10%
Alligator or Crocodile .. 70&10@75%
Baxter Pattern S Wrenches .. 70&5@70&10%
Drop Forged S ..... 45@45&5%
Acme ..... 60&10%
Alligator Pattern 70%
Bull Dog 70%
Bemis & Call's:
Adjustable S 40%
Adjustable S Pipe 40%
Bemis Pipe 50%
Briggs Pattern 40%
Combination Black ..... 40&5%
Combination Bright 40%
Merrick Pattern 50%
Boardman's 33⅓%
Coes' Genuine Knife Hdl. 40&10&5&5%
Coes' Genuine Steel Hdl. 40&10&5&5%
Coes' Genuine Key Model. 40&10&5&5%
Coes' "Mechanics" ... 40&10&10&5&5%
Donohue's Engineer ..... 40&10%
Eagle ..... 50&10%
Elgin Wrenches 40%
Elgin Monkey Wrench Pipe Jaws. 33⅓%
Gem Pocket 30%
Hercules 70%
W. & B. Machinist:
Case lots ..... 50&5%
Less than case lots 50%
Improved Pipe (W. & B.) 60%
Solid Handles, P., S. & W. .. 50@50&5%
Stillson 65%
Vulcan Chain 50%

Wrought Goods—

Staples, Hooks, &c., list March 17, '92 ..... *90@90&10%*

Yokes, Neck—

Covert Saddlery Works, Trimmed .. 70%
Covert Saddlery Works, Neck Yoke Centers 70%

Yokes, Ox, and Ox Bows—

Fort Madison's Farmers' & Freighters' ..... list net

Zinc—

Sheet ..... *per 100 lbs., $6.75@7.00*

For the Table of "Current Metal Prices" see the First Issue of Every Month.